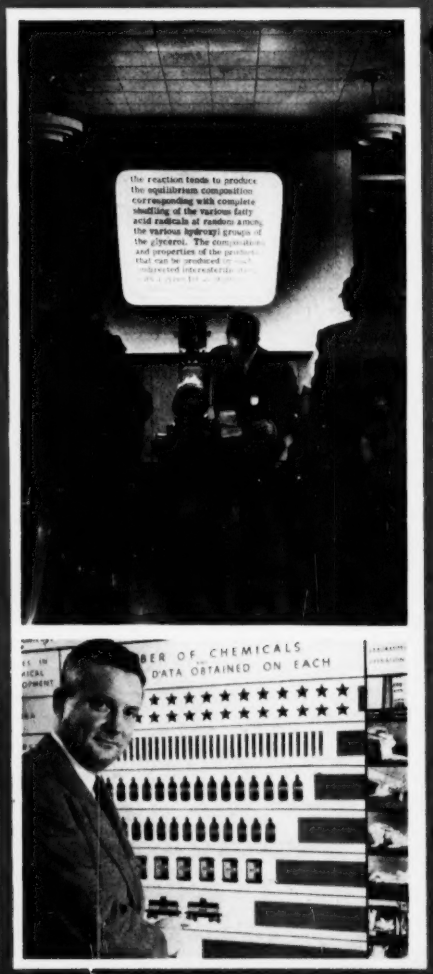
Chemical Week

May 10, 1952

Price 35 cents


the reaction tends to produce
the equilibrium composition
corresponding with complete
shuffling of the various fatty
acid radicals at random among
the various hydroxyl groups of
the glycerol. The composition
and properties of the products
that can be produced in such
BER OF CHEMICALS
DATA OBTAINED ON EACH

Top business problem: speeding "idea traffic"; here's how Standard Oil licks it . . . . . p. 22

CW Report: Natural gas price trends will crimp, recast chemical future . . . . . p. 25

What they can do, what they can't; here's a close-up on soil stabilizers . . . . . p. 35

"Office-in-the-hat" resellers fade as chemical supplies lose "fast-buck" luster . . . p. 43

Carbide's McClure: He's all set to ring the cash register for a chemical revolution . . . . p. 66

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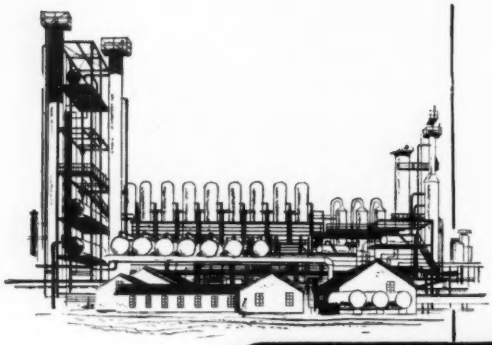

PETROCHEMICALS BY PIPELINE . . .

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Ethylene Glycol

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Ethylene Oxide

Ethylene Dichloride

Dichloroethylether

A highly versatile intermediate, solvent, plasticizer and coupling-agent, Mathieson Diethylene Glycol is applicable in the manufacture of printing inks, surface-coating resins, composition cork and plastics. It is also used as a tobacco humectant.

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MATHIESON CHEMICAL CORPORATION • BALTIMORE 3, MARYLAND

Chemical Week

Volume 70 Number 19

May 10, 1952

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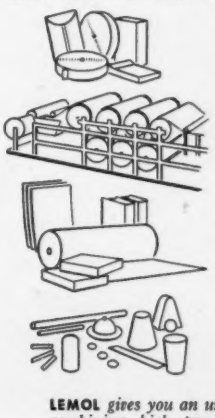
LEMOL 22-88 — Medium viscosity, partially hydrolyzed . . . Permits higher working concentrations than 42-88 type . . . Protective colloid . . . Emulsifying agent . . . Thickening agent . . . Extender for polyvinyl acetate emulsions . . . Remoistenable adhesives . . . Warp size for acetate and nylon yarn . . . Water soluble unsupported film . . . Temporary protective coatings.



LEMOL 5-88 — Low viscosity, partially hydrolyzed . . . Most water sensitive grade . . . Emulsifying agent . . . Remoistenable adhesives . . . Warp size for acetate and nylon yarns . . . Least sensitive to added salts . . . Temporary protective coatings . . . Temporary ceramic binder.

LEMOL *gives you an unusually tough, water soluble resin combining high tensile strength, tear-resistance, and toughness with extreme inertness to ageing, oxidation and bacterial action.*

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(This advertisement originally appeared in full-color in TIME, BUSINESS WEEK and FORTUNE.)

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You are always close to Continental Can with its 65 plants in the United States, Canada and Cuba, 17 field research laboratories and 63 sales offices.

THE STORY OF DRUMS THAT ARE BETTER IN EVERY WEIGH

Some containers for shipping bulk materials weigh almost as much as their contents. Although they give good protection, they run up shipping costs, particularly when products are moving air express or overseas.

Continental gave this situation a lot of study and today offers a variety of fibre drums which combine full product protection with light weight—and that's sweet music to any shipper.

These containers can carry up to forty times their own weight. The secret of their strength is *resiliency*. An accidental fall or bump that might shatter a rigid container only bends the flexible walls of a Continental drum.

Right now, Continental fibre drums are being used to ship hundreds of materials for both civilian and defense use. Included are chemicals of all kinds, such as resins, plastics, intermediates, detergents, dyestuffs and pharmaceuticals; also many powdered and dehydrated foods.

Like most Continental products, our fibre drums are the result of a long period of development and improvement. Continental chemists found better ways of laminating kraft paper for extra strength. Continental engineers developed better closures. Most recently, special linings for "difficult" products, such as wet or greasy materials, have been devised. This research work on drums is typical of Continental's never-ending search for better materials, designs and methods.

CONTINENTAL CAN COMPANY

CONTINENTAL CAN BUILDING

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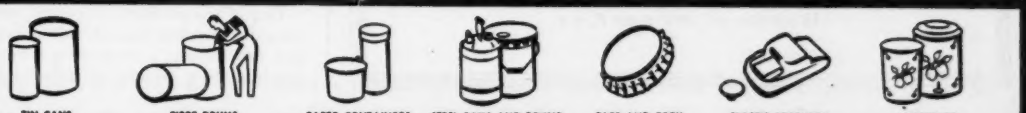

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OPINION....

A Little Dubious

To THE EDITOR: Your issue of April 26 left me better-informed, but frankly, a little dubious about editors' thinking processes.

To quote from the piece, "How Are YOU Doing" the underscored lead says:

"The chemical process industries—paralleling and often surpassing general business activity—*have performed remarkably well since 1947.*"

Now from the first line of text: "You can't lump the chemical process industries together and say they've done well—or done poorly."

Moreover, the remainder of the article contributes little to the resolution of this bare-faced contradiction.

Healthy disagreement is the life's blood of a free and active press. But must it be within the content of first eleven lines of the story?

I am a former newspaperman . . . understand the workaday hazards of the journalistic profession. But really, this is carrying things too far.

Otherwise, your book is highly absorbing, well-written and a real credit to business journalism.

MAXWELL B. YATES
East Orange, N. J.

Spring is here. Our staid statistician had all the facts and figures in the article soberly accurate; a CW writer, however, was frolicking with words, mentally wool-gathering.—ED.

No PVC, This

To THE EDITOR: In your Apr. 19th. issue . . . in an article entitled "In There Plugging" discussing bath tub caulking compounds . . . you said that our company introduced Tub-Tite to the West Coast market last year . . . implied that it is based on a polyvinyl resin.

Ours is the original all-plastic base bath tub caulk . . . was first sold to the trade in 1947. Within a few months time we had dealers in every part of the U. S. A.

Tub-Tite should not be classified as a PVC resin. It definitely is not based on this material, which was ruled out in our early experiments because of embrittlement and unsuitability for outdoor use, as well as lower adhesion to construction materials. Since our resin base is entirely different, Tub-Tite should not be classed with PVC caulkings. The latter are imitative . . . certainly not the same.

One of the products you mentioned even disintegrates immediately in contact with water . . . indicating a vinyl emulsion base which certainly could

sodium (metallic) . . . .

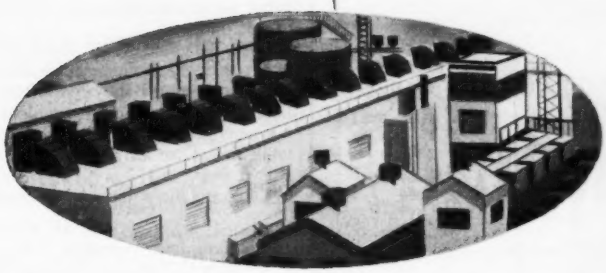
IMMEDIATE AVAILABILITY

TANK CARS—cast solid (80,000 lb. net)

DRUMS—bricks (1-25 lb.) or cast solid

smaller quantities in tins and pails

also dispersed sodium samples



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and independent
on the Houston ship channel – –

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among other products sold under "ETHYL" trade-mark: antiknock compounds, benzene hexachloride (technical), ethyl chloride, hydropolymer oil, salt cake.

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ANHYDROUS SODIUM METASILICATE

DRYMET is the most highly concentrated form of metasilicate available, because it contains no water of crystallization. Unique among alkalies—it combines strength with buffering action which prevents abrupt changes in pH. If you use alkali—investigate DRYMET.

A granular, free-flowing alkali with the following properties:

Formula..... Na_2SiO_3

Molecular Weight...122.06

Na_2O 51%

pH in a 1% Solution..12.75

Quickly and completely soluble in water up to a concentration of 35% 1.0 lb. DRYMET equivalent to 1.6 lbs. sodium metasilicate pentahydrate.

WRITE FOR DRYMET File Folder containing complete technical information.

*Reg. U. S. Pat. Off.

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We believe in the soundness of the American chemical industry and its prospects for growth and will look sympathetically upon companies or individuals who have financial problems in this field.

Chemical Department

Empire Trust Company

120 BROADWAY, NEW YORK, N. Y.

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

OPINION . . . . . .

not be expected to have the water resistance so essential in a shower stall. Some . . . do not adhere to many construction materials such as paper, porcelain, glass, aluminum, wood . . .

JAMES KLEE
President
American Fluresit Co.
Cincinnati, Ohio

Thanks Reader Klee, CW mentioned eight resin-based caulking compounds, stressed that although a number had been sold in bulk lots to industrial users for several years, it is only now that most are being packaged for retail sale. Target: $35 million market.

We did, indeed, emphasize the polyvinyl products (by citing a typical formulation) did not intend to imply that all the caulks mentioned were so based. Some contain polyvinyls, others alkyds or kindred resins.—ED.

Dangerous Sedative

TO THE EDITOR: Re your editorial "Bad Bargain for Everyone" (Mar. 29) . . .

In my opinion, it is imperative that publications, such as CHEMICAL WEEK, come out clearly and vigorously as you have done on this subject. Too many employers are falling into the trap of seeking an easy way out by going along with the union-shop demand.

It is a dangerous sedative and merely obscures the malignant infection of our whole industrial system which is bound to develop into a complete labor-monopoly control of the right to work unless we all pull together and stop it now.

Congratulations on your editorial.

W. H. WINANS
Vice-President—Industrial Relations
Union Carbide and Carbon Corp.
New York, N. Y.

TO THE EDITOR: . . . This [union shop] controversy concerns us all . . . If the union shop recommendation is put into effect by the government another freedom will have been taken from the American people . . .

MERRICK JACKSON
Vice President
Hill and Knowlton, Inc.,
New York, N. Y.

Spate Hassle

TO THE EDITOR: . . . In your market Letter (Apr. 12) you mention an alkali process for manufacturing superphosphate, say that it is "in operation in a spate of foreign countries."

I noted with interest some time ago

PRODUCT CONTROL THROUGH INFRARED ANALYSIS

Number 5 *of a Series of Data Sheets for Better Process Control from The Perkin-Elmer Corporation, Manufacturers of Infrared Spectrometers, Flame Photometers and Electro-optical Instruments.*

PROBLEM:

To assay khellin and visnagin in an extract of seeds of Ammi visnaga Lam.

PLANT:

Smith, Kline & French Laboratories, Philadelphia, Pa.

SOLUTION:

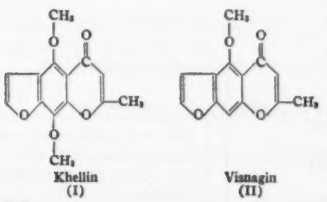
Infrared analysis. The crude extract is dissolved in chloroform and the infrared spectra determined between 8 and 9 microns. In this region the spectra of khellin and visnagin are sufficiently different to permit their accurate estimation (see spectra, right).

INSTRUMENTATION:

Perkin-Elmer Model 21 Spectrophotometer, sodium chloride optics, standard liquid absorption cell with 0.1 mm spacer.

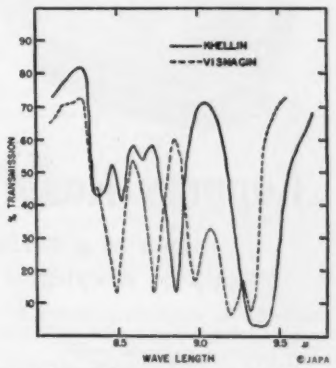
DISCUSSION:

Because of their chemical similarity (see below), khellin and visnagin are difficult to determine chemically in a crude extract. Because of their widely divergent spectra in the 8 to 9 micron region, the assay of khellin and visnagin mixtures becomes a routine infrared analysis. Time per assay: 20 minutes.

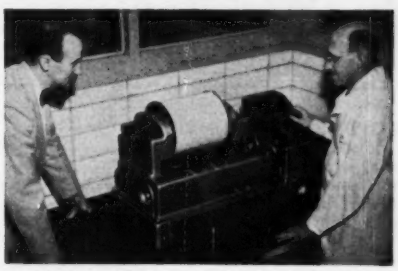


REFERENCE:

J. of the Amer. Pharm. Assn., Sci. Ed., XL, 6, 1951, pp. 280–286.



Comparison of the absorption bands of khellin and visnagin in the 8-10 μ region.



Perkin-Elmer Model 21 Spectrophotometer aids new product development at Smith, Kline & French.

Let us discuss your Product Control Problems with you.

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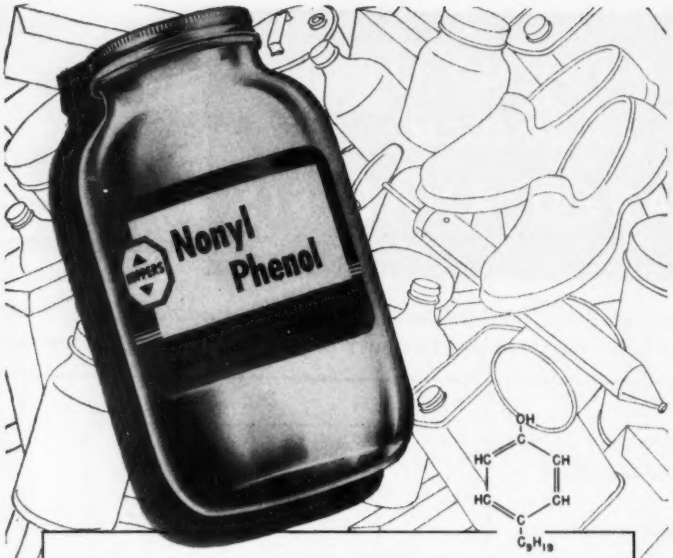
This 8-page quarterly brings you the latest developments in electro-optical instrumentation as well as their application to research and process control.



Koppers Nonyl Phenol

One of a Series of Koppers Alkylated Phenols

Suggested for use in the production of a number of chemical products which require a mono-alkylated phenol of relatively high boiling point and molecular weight.

The properties of Nonyl Phenol indicate usefulness in the production of detergents, modified phenolic resins, non-ionic surface active agents, dispersing agents and wetting agents, lubricating oil additives and corrosion inhibitors, rubber chemicals, plasticizers, plastic stabilizers, germicides, insecticides, fungicides, oil soluble resins, tanning agents, dyestuffs and pharmaceuticals.

● KOPPERS NONYL PHENOL is produced in commercial quantities. It is a slightly viscous, clear liquid; only very slightly soluble in water, but miscible with common organic solvents.

REACTIONS

Two of the three normally reactive nuclear positions are unsubstituted in this alkylated phenol; they are subject to such reactions as acylation, and condensation with aldehydes. It is a mixture of monononyl phenols, predominantly substituted in the para-position.

The unhindered phenolic hydroxyl group undergoes such reactions as etherification, esterification, vinylation, ethylene oxide condensation, and formation of nonylphenoxyacetic acid.

PROPERTIES

Boiling Range	290° — 300°C.
Hydroxyl Number (theory 255)	250
Specific Gravity, 30°C.	.940—.944
Refractive Index, 20°C.	1.5118

FOR FURTHER INFORMATION
write to Koppers Co., Inc., Chemical Division

KOPPERS COMPANY, INC.
Chemical Division, Dept. CW-5-10
Koppers Building, Pittsburgh 19, Pa.

KOPPERS

OPINION . . . . . .

the explanation you made . . . on the meaning of the word "hassle"; perhaps you will explain to me the meaning of the word "spate" . . .

Webster defines this as a British term meaning a freshet or a heavy rainstorm.

WESLEY H. SOWERS
Vice-President
Frontier Chemical Co.
Wichita, Kan.

Right as rain, Reader Sowers, is your definition of spate; less commonly it is used to mean "a large number."—ED.

Double Scorer

TO THE EDITOR: . . . I'm curious. If my memory is in good shape it seems to me that I saw a picture of Du Pont's Mr. H. Jones *(CW, Mar. 15)* on your cover once before. If so is he the first man to have been on your cover twice? . . .

ROBERT LINDLEY,
Newark, N. J.

Genial, thoughtful (and newsmaking) "Hack" Jones is the first man to have twice "made" CW's cover. The previous occasion: Apr. 14, '51.—ED.

Pencil Probe

TO THE EDITOR: Your photo-story "Pencil Probe" (Apr. 26) is gratifying to see. Wood-cased pencils are so frequently taken for granted . . . people lose sight of the magnitude of the problems involved in their manufacture.

. . . Large quantities of fats, oils, waxes, acids, alkalis, minerals, pigments, gums . . . rubber chemicals and industrial finishes are used by the industry . . . The constant program of examining new materials constitutes a real "pencil probe". . . the endeavor being to continue to offer the best in writing and marking mediums . . .

CHARLES W. WOODRUFF
Research Director
Linton, Inc.,
Lewisburg, Tenn.

Sidelight: Pencil-maker Woodruff, in the tradition of his industry, pencil-signed his letter.—ED.

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: The Editor, Chemical Week, 330 W. 42nd St., New York 36, N. Y.

yours to use

5
TANK STORAGE TERMINALS—
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- Port of New Orleans (Goodhope, La.)
- Chicago
- Houston
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View of Terminal at Goodhope, Louisiana

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CHEMICALS — PLASTICS

FOR YOUR INFORMATION

Every month Monsanto publishes these pages of pertinent information which may be helpful to you. This issue discusses:

- Mildew Proofing
- Ortho-Nitrochlorobenzene
- Sulfuric Acid Plant
- Plasticizers
- Corrosion-preventing Paper
- Dessert Recipes
- Pilotite S-5
- Maintenance Paints
- Biological Resistance
- Sodium Tripoly Phosphate
- Tetra Sodium Pyrophosphate
- Phosphoric Acid

Additional information on any of these subjects will be provided by any Monsanto Sales Office in response to your request by coupon or letter.

Putting the right qualities in adhesives for bags, bottles or books

The trend is away from the old-fashioned glue pot. It's toward the modern adhesives that give efficient bonding between widely varied materials and meet the needs of high-speed machines for labeling, sealing or fabricating.

You can select the qualities you want in adhesives for bags, bottles or books by choosing a Monsanto Plasticizer. In the large family of Monsanto Plasticizers you'll find one or more to exactly fit your needs whether you're making hot-melt, tacky, nontoxic or heat-sensitive adhesives.

Monsanto Plasticizers serve in adhesives based on polyvinyl acetate, polyvinyl chloride, zein, casein, polyvinyl butyral, styrene, ethyl cellulose and polyvinylidene chloride.

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- Ortho-Nitrobiphenyl
- Dimethyl Phthalate
- Dibutyl Phthalate
- Santicizer* 140
- Santicizer 160
- Santolite* MHP
- Santolite MS (80%)
- Tricresyl Phosphate
- Triphenyl Phosphate

For Heat-Sensitive Adhesives:
- Diphenyl Phthalate
- Santicizer 1-H
- Santicizer 3
- Santicizer 9

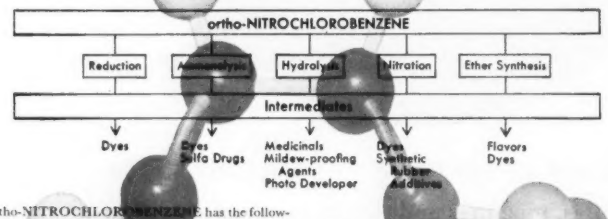
For Hot-Melt Adhesives:
- Dibutyl Phthalate
- Diphenyl Phthalate
- Santicizer 160
- Santicizer 8
- Santicizer M-17

For Nontoxic Adhesives:
- Santicizer 141
- Santicizer B-16
- Santicizer E-15

Research Chemists' Corner

You may find something new here

In your research to find new products or improve your present line, it may be worth your while to take a long look at Monsanto ortho-NITROCHLOROBENZENE, an extremely versatile intermediate. The following chart illustrates its possibilities in industry:



Ortho-NITROCHLOROBENZENE has the following physical properties:

Molecular weight	157.56
Standard form	Crystalline mass
Color	Greenish yellow
Crystallizing point	31.5° C. Min.

There may be many additional uses for this versatile product. Qualified chemists who are interested in doing some research with ortho-NITROCHLOROBENZENE can get samples by contacting the nearest Monsanto Sales Office or by mailing the coupon.

Is "The Mrs." worried about the length of your belt?

You don't have to give up sweets just because your waistline is getting to the point where your wife is worried about the length of your belt. Just have her make desserts sweetened with Monsanto Saccharin. She doesn't know how? Well, mail the coupon and we'll send you a copy of the Monsanto recipe book. It contains nearly a score of recipes for delicious dishes sweetened with nonfattening saccharin.

Monsanto laboratories develop method of mildew-proofing vinyls

Monsanto Research has developed a new method of incorporating Milmer* 1 into vinyl coatings. The process, which is easy to use, permits the inclusion of Milmer 1 without crocking or blooming in calendered, plastisol, organosol and solvent coatings. It may be put into the coatings, the fabric or both.

Milmer 1 is effective in controlling mildew in both supported and non-supported vinyls.

Large quantities of Milmer 1 now go into coated fabrics for military use. It is employed in vinyl-coated duck and complies with many government specifications, including: MIL-F-4143, MIL-D-10860, KK-L-136B, 24-C-20, MIL-P-3003, MIL-F-6107, MIL-D-10799, MIL-T-10168A, MIL-P-10404, and MIL-C-5462A.

Peacetime uses of Milmer 1 in coated fabrics include tents, tarpaulins, upholstery, collapsible boats, collapsible tanks, irrigation dams and numerous others.

If you are interested in preventing mildew in vinyl coatings, sheeting or insulation, investigate the Monsanto method of using Milmer 1. You can get complete details from the nearest Monsanto Sales Office or by mailing the coupon.

Protection for metal parts

In the past, machine guns and metal parts of other military equipment shipped to Korea have been protected in transit by a heavy coating of grease. Removal of this grease has been one of the most tiresome of details . . . a detail no longer necessary, thanks to chemistry. A patented wrapper, in which Monsanto Dicyclohexylamine is used, prevents corrosion. For sources of supply, mail the coupon.

Monsanto planning to build 250-ton sulfuric acid plant

Working with Tide Water Associated Oil Company, Monsanto is planning construction of a jointly owned, 250-ton sulfuric acid plant at Avon, California. The plant

will employ the Monsanto-Ross-Wilde process of recovering water-white acid from petroleum sludge acids.

Refinery wastes, sludge and hydrogen sulfide will be piped from the adjacent Tide Water Associated Oil Company refinery. Most of the sulfuric acid produced will be piped back to the refinery where it will be used in processing aviation gasoline and other petroleum products. Any surplus will be sold to West Coast industries.

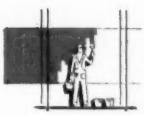
The Monsanto-Ross-Wilde process is a flexible, low-temperature method of recovering acid from refinery wastes. It recovers a high percentage of acid in the petroleum sludge, forming a gas that is higher in sulfur content than that obtained by burning elemental sulfur which now is in short supply.

If you are interested in constructing a similar plant, you may consult Monsanto Engineers without cost or obligation. For complete details, mail the coupon.

AROCLORS

IN PLENTIFUL SUPPLY

Additional capacity, now completed, makes the AROCLORS* (chlorinated biphenyl and chlorinated polyphenyls) freely available . . . Some uses of the AROCLORS are included on this page —Technical Bulletins are available dealing with structural and application data. See coupon for listing.



Pliolite S-5 and AROCLORS

Used as standard plasticizers and resin extenders, the AROCLORS contribute fast-drying properties to Pliolite S-5—provide excellent protection against acids and alkali, moisture and other common corrosive influences. Widely applied to protective and decorative coatings for concrete and steel structures, railway tank cars, concrete floors and walls, stucco construction, wood and metal marine equipment.

Maintenance paints and AROCLORS... Other applications

The destructive action of water, acids, alkali and other corrosive influences are effectively resisted by metal-surface paints that are formulated with AROCLORS. These Monsanto chlorinated biphenyl and chlorinated polyphenyls also contribute nonflammability, superior adhesion, high gloss. In addition, the AROCLORS possess good electrical properties . . . Besides their application to paints, the AROCLORS are used in formulating modified and synthetic rubber coatings, lacquers, hot metal strip coatings, vinyl protective coatings, adhesives, fire-resistant coatings, wood-sealer formulations, marine paints.

Biological resistance and AROCLORS

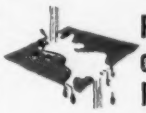
In recent tests, Monsanto AROCLORS exhibited distinct resistance to fungi and bacteria. The presence of this resistance in AROCLORS indicates that further study of these commonly used plasticizers can prove highly interesting wherever various types of organism attacks are encountered. Excellent repellency of termites and other soil mites is another AROCLOR feature.

ASK FOR AROCLOR LITERATURE

Contact any Monsanto District Sales Office, or write direct, for any of the following Technical Bulletins — No. P-115, "THE AROCLORS" . . . No. P-124, "AROCLORS as used in chlorinated rubber" . . . No. P-126, "AROCLORS as used in Pliolite S-5" . . . No. P-131, "AROCLORS as co-plasticizers for polyvinylchloride."

Sequestering action and water-softening power of Monsanto Phosphates

The sequestering action of Monsanto phosphates—inactivation of calcium and magnesium water hardness—is a significant property of both Monsanto Sodium Tripoly Phosphate (STP) and Tetra Sodium Pyrophosphate (TSPP) . . . In detergent and cleaning operations, these Sodium Phosphates combine with the calcium and magnesium ions present in hard water. They form complexes with these ions — the complexes remain soluble in water, but will not react with other substances to form insoluble precipitates . . . They have the ability to regenerate or re-dissolve insoluble calcium and magnesium soaps. This property is of value where clothes containing a residue of insoluble curds are agitated in a solution of STP or TSPP. Fabrics are restored to their original clean condition.



Peptizing value of Monsanto Phosphates

An outstanding property of Monsanto TSPP is its peptizing value—that is, the ability to keep small particles of solids suspended in a water solution. This suspension action prevents the re-deposition of removed soil during the cleaning and rinsing cycle.

MONSANTO PHOSPHORIC ACID

Monsanto supplies phosphoric acid of high purity in concentrations of 75% and 85% H_3PO_4. 75% phosphoric acid is available in tank cars, stainless steel drums, barrels and carboys and meets Food Grade specifications. 85% phosphoric acid is available in stainless steel drums and carboys and meets N. F. specifications.

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MONSANTO CHEMICAL COMPANY, 1700 S. Second Street, St. Louis 4, Missouri. District Sales Offices: Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle. In Canada, Monsanto Canada Limited, Montreal.

Reg. U. S. Pat. Off.

MONSANTO
CHEMICALS AND PLASTICS

SERVING INDUSTRY... WHICH SERVES MANKIND

SEND INFORMATION: ☐ Plasticizers for Adhesives. ☐ Mildew-proofing vinyls. ☐ Sulfuric acid plant designs. ☐ Corrosion-preventing paper.

SEND LITERATURE: ☐ Saccharin recipe book. Technical Bulletins ☐ No. P-115, "THE AROCLORS." ☐ No. P-124, "AROCLORS as used in chlorinated rubber." ☐ No. P-126, "AROCLORS as used in Pliolite S-5." ☐ No. P-131, "AROCLORS as co-plasticizers for polyvinylchloride."

SEND SAMPLE: ☐ Ortho-Nitrochlorobenzene.

MONSANTO CHEMICAL COMPANY
1700 South Second Street, St. Louis 4, Missouri

Please send, without cost or obligation, information, literature or samples as indicated at left.

Name.....Title.....

Company.....

Street.....

City.....Zone....State.....

Every small worm gear unit is built to precision standards—as outstanding in quality and performance as larger size Clevelands.
Illustrated above are the 10 AT (left) and 00 D (right) speed reducers.

Enjoy the benefits of worm gear drives in smaller CLEVELAND speed reducers

WHEN you want a quiet, powerful, dependable drive for a small machine, choose a Cleveland Worm Gear Speed Reducer.

As built by Cleveland, the worm gear reducer is a drive of many advantages:

1. It is compact and inherently quiet, transmitting power with smooth, uninterrupted torque flow.
2. Its right-angled design saves valuable space.
3. It has a minimum of moving parts.
4. Shock load resistance and other factors of safety are high.
5. Rate of wear of case hardened steel worm on nickel-bronze gear is very low, insuring long life.

Write for Bulletin 114F which illustrates and gives engineering data on smaller size Clevelands—many now available for immediate delivery. The Cleveland Worm and Gear Company, 3291 E. 80th St., Cleveland 4, O.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Speed Reducers

NEWSLETTER

If your products can bolster the European defense effort, Mutual Security Agency (successor to the Marshall Plan) can be a strong right arm to support your expansion plans.

Latest example: National Aluminate Corp. (Chicago) has an Italian subsidiary which, like its parent company, makes chemicals to prevent scale formation, corrosion and foaming in steam boilers.

Since MSA believes these products—destined to supply European railway systems—will promote defense, it has guaranteed convertibility, up to $1,331,000, of lira into dollars.

But another arm of the government is looking hard at a tax "loophole," may inadvertently penalize growth companies in the plugging.

A special study prepared for a Congressional joint committee by Economics Professor James K. Hall recommends a tougher penalty tax on undistributed profits.

Such a law is already on the books—Section 102 of the Internal Revenue Code—but it's been used mainly against closely held firms where profits are piled up to avoid heavy personal income taxes.

Hall wants to apply the law to publicly held corporations, making it difficult for them to set aside funds for future investment.

Out of a total 514 corporations that have been hit for $14.2 million during the past eleven years, 14 were chemical firms, which shelled out $157,000.

That's not much—but a new, tougher policy and higher penalty rates, also suggested by Hall, could make it a lot more.

The U. S. Public Health Service is having trouble giving away money, and it's all the result of the thorny states' rights question.

Virginia, perennial states' righter, prefers not to have Federal money to support its anti-pollution activities (CW Newsletter, Apr. 19).

But the Ohio Health Department's anti-pollution unit is worried lest the U. S. Senate may not restore the House's cut in grants to states. It has been getting about $25,000 a year to support its program.

The TB drug boom (CW, Mar. 8) is filtering down to suppliers of isonicotyl hydrazide intermediates.

Pittsburgh Coke & Chemical has just started production of isonicotinic acid from its own gamma-picoline.

There's a new name in Texas. The erstwhile McCarthy Chemical Co. (Houston) is now Texas Gas Corp.

The new name describes the firm's activities better—it purchases natural gas, removes liquid hydrocarbons, and distributes the gaseous remainder—and it prevents confusion with Glenn McCarthy, Inc.

Founder McCarthy is still chairman of the board.

Vinyl films have become big business—to the point where ten manufacturers have banded together to form a vinyl-film-under-10-mils section of the Plastic Coatings & Film Association. Problems they'll

tackle: product simplification and standardization, standard nomenclature, relations with the government and the public.

A further rundown of first-quarter reports show that only the sulfur and petroleum companies are generally faring as well as last year.

Texas Gulf Sulphur had 16% better sales; 15% higher net; Jefferson Lake Sulphur's net was up a thumping 60%; Duval Sulphur & Potash sold 30% more, netted 28% more.

Standard Oil (N.J.), Standard Oil (Calif.), Phillips Petroleum, Shell Oil, Lion Oil, Sinclair Oil and Warren Petroleum sales went up (5.7-20.5% increase) and all had higher net profits (up 1.8%-27.6%).

General Refractories (net up 37.5%) and Vanadium Corp. (net up 2.6%) were the only other exceptions to the general rule.

Even some oil companies had lower nets in the face of rising sales: Standard Oil (Ind.), off 7.3%; Continental Oil, off 15.5%; Tide Water Associated Oil, off 24.2%.

And the rest of the reports present an unrelieved panorama of minus signs. Among those with higher sales but lower net: Du Pont, Victor, Mathieson, Koppers, Sterling Drug, Norwich Pharmacal, Abbott Laboratories, Lambert Pharmacal, U. S. Rubber and St. Joseph Lead.

But some not only profited less but also sold less: Commercial Solvents, American Potash, Interchemical, Nopco, Corning Glass, Rayonier, Liquid Carbonic and Minnesota Mining & Manufacturing.

Pallid profits have not cast a pall over expansion plans:

Hooker Electrochemical has let a contract for its $10 million chlorine-caustic plant at Muskegon, Mich., is now studying British Columbia markets to determine whether it should build there.

International Minerals & Chemicals is now spending $1½ million, has earmarked an additional $1.8 million for monosodium glutamate expansion. Current spending will boost capacity at San Jose, Calif., by two-thirds—to 6.6 million pounds a year. Later spending will boost concentrator capacity at raw material source sites in Idaho, Utah, and at new plants.

American Cyanamid will go ahead with a $50-million plant near New Orleans to make ammonia, acetylene, hydrogen cyanide, acrylonitrile and ammonium sulfate. These initial products will provide for eventual manufacture of various industrial and agricultural chemicals.

A sizeable batch of new certificates of necessity issued this week by DPA also points to continued expansion:

Among the over-a-million-dollar: Socony-Vacuum, synthetic bead catalysts; Esso Standard, sulfur; Bay Petroleum, butane and butylenes.

Small ones: National Lead, Zirconium tetrachlorides; Tennessee Corp., manganese sulfate; Ohio-Apex, phosphorus oxychloride; Jefferson Chemical, nonylphenol; Diamond Alkali, sodium silicate; Sid Richardson, sulfur; Allied Chemical, sulfur; Shell Oil, benzene; Universal Oil, benzene and toluene components; Wilson & Co., cholic acid; Edwal Laboratories, formaldehyde bisulfite and metol.

Krilium by mail order is Monsanto's latest move to retain its head in acrylic soil conditioners. A new "improved formulation" (Merloam) will sell 5 lb. for $6.95—one package to a family.

Monsanto is now busy signing up distributors, flexing its legal muscles to protect itself, through patents, against a spate of competitors.

. . . The Editors

How porous *do you want your* catalyst supports?

Norton catalyst supports come in two types:

1. If your process calls for coated catalyst supports, you get what you want from Norton medium-porosity spheres. They have a porosity of 30-35%, with a rough, open surface structure. This gives you maximum adherence of catalyst to surface.

2. If you need supports for impregnation, Norton high-porosity spheres are your choice. Their porosity is 42-47% with large, connected, internal pores uniformly dispersed throughout the support. This gives you maximum deposition of catalyst.

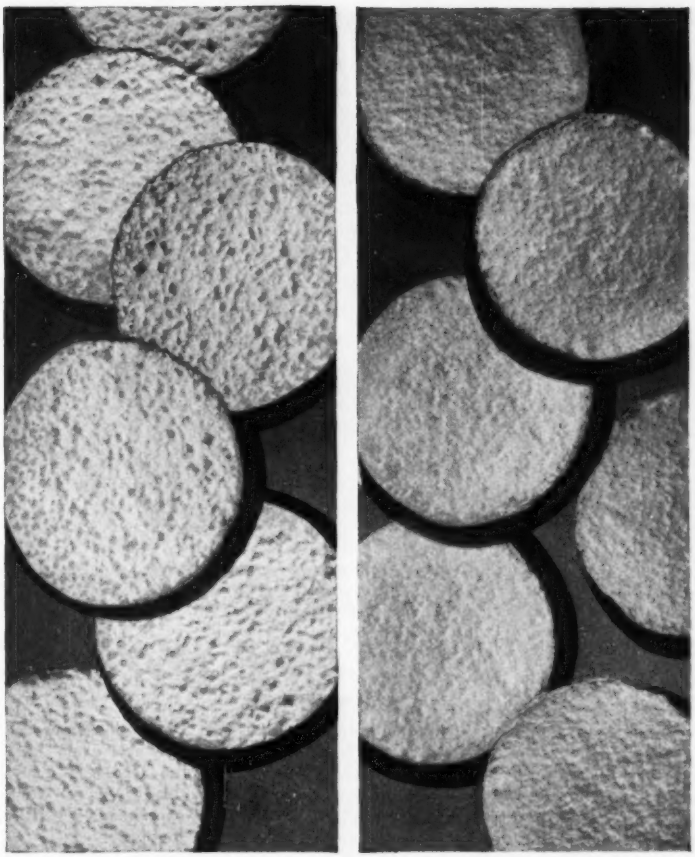
You also have a choice of sizes and shapes. Norton spheres are available in diameters of 3/16" to 1". Other Norton catalyst supports, in ring and pellet form, available in diameters of 1/8" to 2".

A choice of materials, too. Norton catalyst supports can be made from a variety of refractory materials, offering many different combinations of properties.

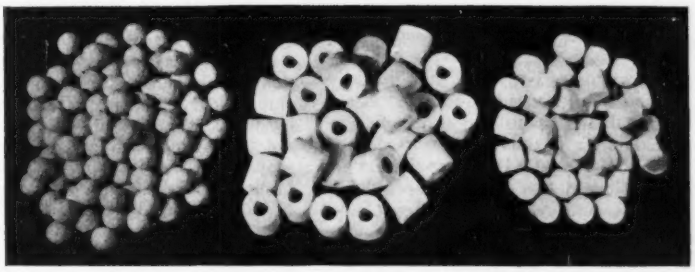
Test them in action

You can easily prove, in your own plant, what Norton catalyst supports can do towards improving your production. Want to see samples? Contact your Norton representative or write direct to Norton Company, 244 New Bond Street, Worcester 6, Mass. *Canadian Representative:* A. P. Green Fire Brick Co., Ltd., Toronto, Ont.

NORTON HEAT EXCHANGE PEBBLES
also offer you worthwhile advantages, especially where alternating oxidizing and reducing atmospheres are met. They're made of ALUNDUM* electrically fused alumina (alumina content 95% to 99%). Nothing like them for static or moving heat exchange beds.



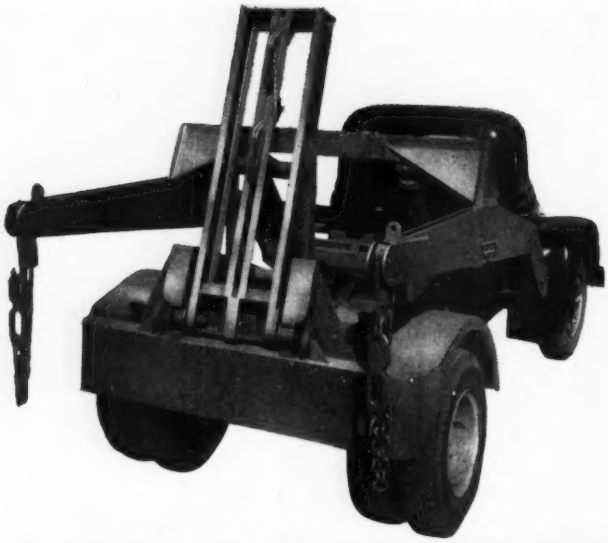
Greatly enlarged views of cross-sections of the two types of Norton catalyst support spheres. *Left: Norton High-Porosity Spheres* have connected pores throughout. *Right: Norton Medium-Porosity Spheres* have pores close to surface. You can also get Norton Low-Porosity Spheres if required.



Norton catalyst supports are made in sphere, ring, and pellet form.

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

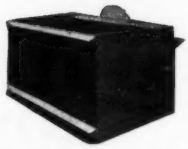
NORTON
Special REFRACTORIES
Making better products to make other products better
NORTON COMPANY, WORCESTER 6, MASSACHUSETTS



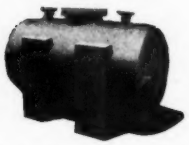
WHY USE 3 TO 5 TRUCKS... WHEN ONLY ONE WILL DO?

In many plants a Dempster-Dumpster, like the one above, operated by only one man, the driver, has replaced 3 to 5 conventional trucks and crews. The reason for this is that one truck-mounted Dempster-Dumpster serves scores of Dempster-Dumpster Detachable Containers up to four times the capacity of the average dump truck body. These containers are built in a wide variety of designs best suited to the type of materials handled—be they bulky, light or heavy . . . solids or liquids . . . trash or rubbish. Containers are conveniently located at accumulation points inside and outside buildings. To illustrate the flexibility of the Dempster-Dumpster System in handling all types of materials in your plant, we show, at right, a few of the dozens of Dempster-Dumpster Containers built to meet every bulk materials handling need. And remember, one truck-mounted Dempster-Dumpster handles all containers, regardless of capacity or design.

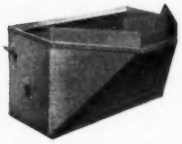
The Dempster-Dumpster System eliminates standing idle time of crews and trucks . . . eliminates re-handling of materials . . . increases efficiency, sanitation and good housekeeping . . . cuts cost of truck equipment and operation tremendously. Without question, it's the most efficient and lowest cost method of bulk materials handling by truck ever devised! The chances are this system will save you thousands of dollars annually. This equipment manufactured and sold exclusively by Dempster Brothers, Inc.



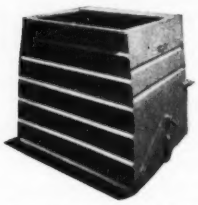
Drop Bottom Container built up to 10 cu. yd. capacity to handle heavy materials.



Tank Type Container meeting A.S.M.E. specifications. Capacities up to 1,200 gallons.

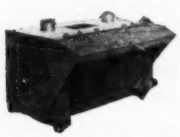


Tilt Type with Converged Lip for handling fine aggregate, wet or fluid materials.



Drop Bottom Pressed Steel Type for lighter service.

Universal Type built up to 12 cu. yd. capacity with top and end doors.



Five cu. yd. container with swivel casters for handling waste blast sand.

WHEN A CONTAINER IS FULL, the Dempster-Dumpster picks it up, hauls to destination and dumps the materials or sets load down intact. These three simple operations, shown above, are hydraulically controlled by driver in truck cab.

DEMPSTER BROTHERS, 252 Dempster Bldg., Knoxville 17, Tenn.

BUSINESS & INDUSTRY . . . . .

OIL'S KNIGHT: Twenty-two act as one, or vice-versa?

On Steel's Heels

The only thing that could push the nation-wide oil strike from the headlines last week was the nation-wide steel strike, and together they have pushed just about everything else off the worry-lists of chemical executives. Their new worries: the sudden cut-off of cokeoven chemicals, refinery chemicals, natural gas, and the big refinery market for chemicals **(see also p. 59).**

Directly hit are the large chemical subsidiaries of oil companies, particularly in the Texas area where the Oil Workers International Union (CIO) is bargaining agent for many chemical workers. Ironic note: Lion Oil Co.'s refinery is still operating because its union isn't striking, but Lion's chemical installations are shut because the Oil Workers represent employees there.

750,000 Out: With 650,000 steelworkers and an estimated 100,000 oilworkers idle, the nation lost 300,000 tons of steel, 3 million barrels of oil (half the total output) a day. The oilworkers are losing about $1.5 million a week in wages, the state of Texas is losing $100,000 a day in taxes on crude oil production—just to quote a few of the frightening figures.

In Texas the "siamese twin" chemical industry—in most cases tied right to the refineries—is as hard hit by raw material lack as if it were struck itself. But throughout the nation, though to a lesser degree, the effects are spreading in an ever-widening circle as more and more industries come to a grinding halt when their supplies are affected in one way or another.

Steel: If the Supreme Court upholds Truman, the companies will probably come around and grant the WSB package in return for a limited price increase. On the other hand, if Truman gets another "no" answer, the union will likely compromise on the union shop and retroactive pay, and the companies will get a better price.

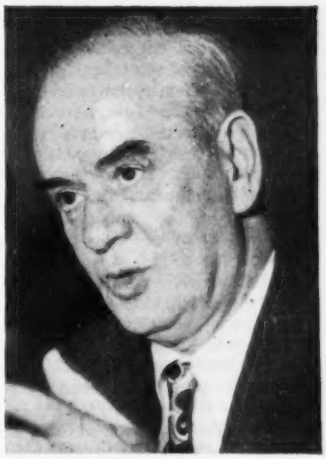
Whatever happens, relations between management and labor in the steel industry are going to be rocky for a long time. Murray has been anything but kind in his statements about the industry, and the rank-and-file are in an ugly and bitter mood. And the companies have not been exactly temperate in their statements, nor conciliatory in their negotiations.

Oil: Unlike steel, the oil strike is being conducted on a plant-to-plant basis, and the exact picture will not be clear until it is all over, or runs a long time. At present it stands about like this: 22 unions—AFL, CIO, and Independent—have struck about half the nation's oil-refining capacity. Pacesetter is the large Oil Workers Union (CIO) under O. A. (Jack) Knight.

Main points of the oilworkers' demands: a 25¢-an-hour wage increase, shift differentials of 6¢ an hour for the evening tour, 12¢ an hour for the night tour. So far most company offers have been under 15¢, with one company, Standard of Indiana at Sugar Creek, Mo., settling for that amount with an independent union not involved in the strike.

Both unions and management are apparently set for a long strike. Management points out that the economy will not be seriously affected for some time with half the refineries still working, and that when the pinch is felt it will hit only civilian consumption. The unions take the same facts to show that their strike is not likely to have serious effect on the defense effort. This is, of course, little or no consolation to chemical companies hungry for shut-off LPG, benzene, propane, etc.

Most experts feel that behind management's reluctance to arbitrate (some of the largest companies boycotted WSB hearings on the strike) is the fear of setting a pattern of industrywide bargaining, which they bitterly oppose. The present "coalition" looks mighty like one big oil union to management, and there is certainly little doubt that some of the larger oil unions would like this to be a fact.



STEEL'S MURRAY: Working or striking, it's WSB music.

Slide-Rule Colony

Organized communities of kindred souls have long been a factor in the world of fine arts, but now the mechanical arts can point with pride at their own adaptation of the idea. When present plans are carried out, North Star, Delaware, will stand as a symbol of collective action by engineering professionals.

The Du Pont Company inadvertently acted as godfather for the development by its decision to build a new office building at Newark, Del., and to move its entire 2,500-man headquarters engineering staff from Wilmington.

Newark is already crowded by an influx of workers attached to Chrysler Corp.'s new tank plant, and Du Pont engineers trying to avoid a 12-mile commutation found that they were forced to buy in a boom-town economy. The only answer seemed to be the establishment of a new suburban village tailored to the engineers' ideas of modern living.

Everybody's an Expert: Without further ado, the North Star Corp.

was formed. Fifty engineers of all branches were charter members; another fifty will be added soon. They obtained an option on 440 acres of rolling farmland and orchards, and civil engineering stockholders are now laying out the future streets, lots, and shopping areas.

As other phases of the work develop, North Star will call on the appropriate engineering talent within its ranks. Wilmington realtors and builders, long subjected to abuse from their knowledgeable customers, are watching with interest what happens when the experts are given free reign to implement their theories.

LABOR . . . . . .

Still Out: The striking members of the Oil Workers International Union (CIO) at Carbide & Carbon Chemical's Whiting, Indiana, plant, who beat their country-wide brethren to the punch were still out last week.

The strike began quietly and is continuing just as quietly with 17 major and minor issues involved. Among these are the same 25¢-an-hour wage boost the Oil Workers are asking all over the country, increased sick benefits with less waiting time, union shop, seven paid holidays instead of six (with pay for holidays as such whether scheduled to work or not), and more vacation time with less service.

Union and company met for the first time with a Government conciliator two weeks ago, but nothing was accomplished and no new meetings scheduled. Company claims the union said at that time that the 17 issues were not current wants, and that the company is in the dark as to just what the union does want. As for the Oil Workers they say practically the entire contract is in dispute.

•

Union Wins: NLRB has ruled that Magnolia Petroleum Co. discriminated against certain of its Texas employees because of union membership. The giant oil company was ordered to "cease and desist from" discouraging membership in the Oil Workers (CIO) or any other labor organizations.

It also was forbidden to inquire about its employees' feelings toward the union, or interfere with employees' rights to bargain collectively.

•

Depression Conditions: Claiming 150,000 out of work in the textile industry, the Textile Workers (CIO) last week asked Congress to set up a 35-hour week, with 40 hours' pay, to prevent conditions like those in the depression. The union also seeks a limit of two shifts to spread the available work.

IT'S A SYSTEM: Central employing means right man in right place.

Planned Technical Personnel

Monsanto Chemical Co.'s technical recruiting plan brings standardized hiring to its nation-wide operations.

Centralized operations, "amateur" employee interviewers, replace old haphazard hiring, insular outlook.

With June ready to bust out all over, and this year's crop of not-so-dewy-eyed graduating chemists and engineers waiting for the best offer, chemical companies are well under way in their respective recruiting drives. No longer do companies wait for young men to knock on the door, or engage in haphazard hiring with the "repent in leisure" attitude. Today it's all planned.

Leading the "new way" in technical hiring, now a well-established pattern in most companies, is Monsanto Chemical Co.'s technical recruiting program. Like most companies with multiple installations (Monsanto has nine plants in this country, two abroad) Monsanto found duplication, confusion, poor placement and general embarrassment resulting from uncoordinated hiring. Each plant, and sometimes even departments, competed with the others for the same men.

Centralized: Today Monsanto operates a thoroughly planned and coordinated company-wide technical hiring policy with the technical employment section of the Personnel Relations Department at the company's head office in St. Louis acting as a centralized clearing house for all applications.

Here come all the needs, present and future, for all plants and technical departments of the company. Here too come all reports from field interviewers, final interviewers, college placement bureaus, etc. From here are sent to the various plants and departments the names of promising applicants for jobs already on file. Generally the technical employment section operates as something of a private employment agency, gathering all the pertinent data on a prospective employee, doing the preliminary screening, and passing on the information to the plant or department involved which does the actual hiring.

Staffed by a manager and two full-time assistant managers, the technical employment section works closely with personnel coordinators in the necessary day-to-day discussions, decisions and arrangements. And it is the heart of a recruiting system that twice a year covers 117 schools from coast to coast.

Man-Hunt: Bright and early in every school year the interviewers set out on a carefully planned campus-hopping campaign that continues into spring. Mainly "amateurs," these interviewers consist of Monsanto men from plants near the particular school. Main advantages of this set-up: Prospective employees are interviewed by men with Monsanto "on-the-job" experience of company policy, and opportunities, men who may actually be the imme-

diate superiors under whom the recruit will work.

The number of schools visited each year is dictated by the manpower situation. Prior to visiting the campus, the interviewer has the central office send out literature to be made available to interested graduates, and to let them know Monsanto is coming. Reception of the interviewer varies: some have a completed application form in hand (the forms are included with the literature); others sit smugly, watching with a smile as the representatives of twelve companies vie for their favor.

Elusive Factors: Today more than ever the graduates' decisions are likely to be based on the more elusive, intangible factors. Most industries are fairly even on such mundane matters as salary, pensions, insurance and working conditions, and the student is more interested in opportunities for fairly quick advancement, plant location, the general prospects of the company, length of working day, etc. Today's graduate is also more interested than his forbears in the immediate job.

When interviews have been completed, all data gathered, with reports, goes to the central office to be evaluated. This preliminary screening is heavily weighted by the opinion of the applicant's professor. The central office then prepares lists of graduates warranting closer scrutiny. The lucky ones on these lists are then invited to undergo another series of interviews at the nearest Monsanto plant or office.

Panel Work: These final interviews are conducted by panels of Monsanto men from various departments chosen to represent most closely the recruit's field of interest. They are drawn from sales, production, research, development, or any other department that could be involved. They interview singly and their comments are pooled when they reach the central office.

Recruit Reserve: Originally Monsanto planned to hire more men than it would actually need at any particular graduation time with the plan of building a reserve against periodic needs or sudden expansions at times when men were not graduating. A fine idea, but it just fell by the wayside as the supply of desirable men shrank to its present level.

Monsanto is pleased with its recruiting program, can see the improvement over the old chaotic days. A particularly powerful dividend is the broader, less localized, composition of its personnel, which brings different ideas, training, and points of view into all plants.

Alberta Gas: Boom and Wrangle

The long-awaited decision of Alberta's legislature on when, whither, how much and by whom the province's natural gas would be exported has finally come; but it hasn't brought peace and quiet. Everybody has a different opinion—depending, apparently, on whether they are on the long or short end of the decision.

Briefly, the Alberta government approved the permit authorizing Westcoast Transmission Co. Ltd. to export the natural gas from the Peace River area to Pacific Northwest markets. As recommended by the provincial conservation board, the quantity was limited to 300 billion cu. ft. over a period of 22 years.

First to howl were the five other applicants who wanted to pipe the gas east to eastern Canada, and south into the United States' Middle West. No indication was given as to what these companies would now do, but the most likely course is to pipe the gas up from Texas.

Not Enough? But the angriest roar came from the Pacific Northwest market area itself. N. Henry Gellert, president of Seattle Gas Co., said that the figure of 300 billion cu. ft. was utterly impractical" and insufficient, with at least five times as much gas required to justify a pipeline serving western Washington and Oregon. Gellert indicated that he would do business, and had already made an oral agreement, with Pacific Northwest Pipeline Co. to take Texas gas. Ray C. Fish, president of Pacific Northwest Pipeline, connected with Northwest Natural Gas Co.—prime competitor that lost out in the Alberta decision—said his firm would immediately file an application in Washington, D.C., to pipe Texas gas to the Northwest. Pacific Northwest expects to begin construction this year of a $130 million pipeline from Texas with a capacity of 200 million cu. ft. a day.

Plenty? To all this Frank McMahon, president of the winning Westcoast Transmission Co. Ltd., replies that the quantity is ample to serve all anticipated markets, and that his company will start surveying immediately for its $100 million pipeline.

Westcoast figures this way. The Alberta Conservation Board estimates the Peace River reserves at 500 billion cu. ft., of which 300 billion is surplus. Westcoast, by virtue of its association with Pacific Petroleum Ltd., which owns a lot of land in the area, claims to have 1 trillion cu. ft.—200 billion defined, expects another tril-

ALBERTA GAS-OIL HUNTERS: Finding is easy, after that comes trouble.

CHEMICAL COMPANIES—HOW THEY FARED

Company, period	Sales 1952*	Sales % chg. yr. ago	Pre-tax earnings 1952*	Pre-tax earnings % of sales	Pre-tax earnings % chg. yr. ago	Net earnings 1952*	Net earnings % of sales	Net earnings % chg. yr. ago
National [1]Cylinder Gas, QMar31	9.2	7.5	2.0	22.5	22.7	0.7	8.1	11.2
Heyden, QMar31	5.8	-24.6[1]	1.0	16.5	-48.4	0.5	7.8	-40.0
Atlas Powder, QMar31	12.3	- 1.0	0.8	6.9	-42.8	0.4	3.5	-20.0
Pittsburgh Coke & Chem, QMar31	11.6	3.0	1.8	15.3	-17.8	0.7	6.4	- 7.8
Allied, QMar31	122.3	- 2.0	23.1	18.9	-20.9	9.8	8.0	- 3.9
Commercial Solvents, QMar31	10.6	-37.8	0.3	3.2	-91.5	0.2	1.8	-88.1
Du Pont, QMar31	382.6	0.5	120.5	31.5	- 2.2	30.8	8.0	-22.8
Texas Gulf Sulphur, QMar31 [1]	18.6	16.0	11.3	60.6	20.4	7.0	37.8	14.9
Victor, QMar31	8.6	1.8	1.5	17.1	-27.6	0.6	7.3	-19.0
Rayonier, QMar31	20.4	- 0.9	6.9	34.0	-12.3	2.9	28.7	2.5
Mathieson, QMar31	29.2	25.5	5.1	17.4	-22.5	2.6	8.7	-10.3
Jefferson Lake Sulphur, QMar31			0.3			0.2		59.4
Pittsburgh Coke & Chem, QMar31	11.6	3.0	1.8	15.3	-17.8	0.7	6.4	- 7.8
Koppers, QMar31	78.6	36.4				2.2	2.9	-13.1
American Potash, QMar31	4.3	-12.5				0.4	9.1	-40.4
Solvay [1]American, yrMar31						3.2		-14.8
Interchemical, QMar31	21.4	-13.5	1.1	5.1	-58.5	0.4	2.0	-53.3
Nopco, QMar31	4.6	-30.3	0.6	14.2	-46.0	0.2	4.6	-43.7
Standard Oil (Calif.), QMar31	261.1	8.9	57.1	21.9	-10.4	41.8	16.0	1.8
Phillips Petroleum, QMar31	170.5	20.5	26.9	15.8	21.5	19.8	11.6	24.5
Warren Petroleum, QMar31	76.0	11.8	10.8	14.2	17.3	5.9	7.7	27.6
Shell Oil, QMar31	289.2	11.1	52.8	18.3	- 0.6	24.3	8.4	8.4
Standard Oil (NJ), QMar31						132.0		11.9
Sinclair Oil, [2]QMar31	220.8	9.2				21.0	9.5	14.0
Lion Oil, QMar31	23.6	5.7	5.9	25.1	4.7	3.3	14.1	8.0
National Distillers, QMar31			7.9		-51.5	3.8		-55.7
Corn Products, QMar31			4.3		-56.2	2.3		-39.6
Norwich Pharmical, QMar31		18.8	0.4	10.1	-26.2	0.2	4.6	-24.5
Lambert, QMar31	8.6	5.0	1.3	15.5	-21.5	0.6	7.3	-29.2
U.S. Rubber, QMar31	20.5	4.1	25.4	11.5	-21.6	6.2	2.8	-31.2
Corning Glass, 12wksMar23	27.4	-19.7	6.0	21.8		2.4	8.6	-33.0
Gen. Refractories, [1]QMar31	14.5	8.9	1.9	12.9	- 5.6	1.0	6.6	37.5
Climax Molybdenum, QMar31			1.5		-55.3	1.1		-51.0
Vanadium, QMar31	9.7	13.8	1.3	13.1	- 9.1	0.6	5.8	2.6
St. Joseph Lead, QMar31	30.9	4.2	7.4	23.9	- 0.5	3.6	11.6	- 6.4

* Millions of dollars.
[1] 1951 figure includes subsidiary since sold.

Current List of DPA-Certified Chemical Facilities

Company and Location	Product	Amount Certified	% Certified
Dewey & Almy, Acton, Mass.	Maleic anhydride	$ 476,000	50
Shawinigan Resins, Springfield, Mass.	Polyvinyl butyral resin	175,750	50
Allied Chemical & Dye, Syracuse, N.Y.	Chlorine	2,600,000	40
Harbison-Walker Refractories, Downingtown, Pa.	Silica refractories	3,873,995	65
Ceramic Color & Chemical, New Brighton, Pa.	Cobalt-nickel compounds	50,324	60
Pittsburgh Coke & Chemical, Pittsburgh, Pa.	Activated charcoal	445,000	75
Davison Chemical, Baltimore, Md.	Synthetic catalysts	353,860	60
Monsanto Chemical, Nitro, W. Va.	Chemicals	1,150,000	45
Diamond Alkali, Painesville, Ohio	Carbon tetrachloride	1,300,000	45
Reilly Tar & Chemical, Indianapolis, Ind.	Crude pyridine	506,328	50
Cities Service, St. Louis, Mo.	Synthetic ammonia	28,055,800	40
Shell Oil, Harris County Tex.	Ethyl chloride	2,645,000 75,000	50 15
Stanolind Oil & Gas, Pettus, Texas	Isobutane	161,400	90
Air Reduction, Shreveport, La.	Oxygen	66,110	60
Union Carbide & Carbon, Houston, Tex.	Oxygen, nitrogen	681,200	50
Stanolind Oil & Gas, Hockley County, Texas	Commercial sulfur	460,000	70
Eastern States Chemical, Houston, Texas	Benzene	554,097	90
Consolidated Chemical Industries, Daytown, Texas	Sulfuric acid	5,945,000	70
Diamond Alkali, Pine Bluff, Ark.	Chlorine, caustic soda	200,000 114,865	70 45
Esso Standard Oil, Baton Rouge, La.	Petroleum chemical products	8,780,000 1,790,000	65 50
Union Carbide & Carbon, Los Angeles, Calif.	Oxygen, nitrogen	1,704,082	55
Burdett Oxygen Co. of Cleveland, Huntington Park, Calif.	Oxygen	100,250	50
Western Electrochemical, Henderson, Nev.	Manganese dioxide	161,746	70
Alaska Chemical, Fairbanks, Alaska	Acetylene, oxygen	75,000	45

lion will be defined next year. Company estimates show that 1 trillion cu. ft. will support the pipeline, and the company points out that the legislation provides for revision of the exportable surplus figure.

Formalities and Boom: While Westcoast awaits completion of the series of formalities necessary before actual building can be started on the pipeline—matters such as Dominion approval of the export and U.S. approval of sales in this country—the boom is on in Alberta and British Columbia. Even mountain peaks, lakes, and unexplored areas are being snapped up by eager oil and gas speculators.

With predictions of an industrial boom in industries using gas—the chemical industry in the forefront—land is being gobbled up from the northern Peace River area to as far south as Vancouver Island. At the huge Albert Pincher Creek gas fields, where Pacific Petroleum has most of the land under reservation, a large gas strike brought five different individuals rushing in to buy mountain tops.

Problems: Whether the present export rate will be sufficient for western Washington or not is still a moot point. Certainly Westcoast thinks it will, is going ahead on that basis; while Seattle Gas will apparently put its faith, and money, in Texas gas. It shapes up as quite a struggle in the offing, with Alberta's long-awaited gas certain at the moment only for eastern Washington and northern Idaho.

EXPANSION . . .

Glass fiber production at Libbey-Owens-Ford's new Parkersburg, W. Va., facilities is under way.

•

Wood pulp will be produced in a new $46 million pulp mill at Ward Cover, near Ketchikan, Alaska, to be built by American Viscose and Puget Sound Pulp & Timber. Production from the plant (by June, 1954) will go to non-paper industrial uses. Plant is said to be first of its kind in the territory.

•

Coal By-Products: Republic Steel, before the last steel stoppage, had been planning to put onstream some new coal by-product facilities at its Youngstown, Ohio, plant. It's part of a $20 million modernization at Youngstown.

•

Styrene Latices: Dow Chemical is planning further expansion of its West Coast polymer facilities. It is planning to build a plant at Pittsburg, Cal., to produce styrene latex.

• Just last week it revealed that it will build a $3 million plant at Torrance for polystyrene production.

in paper manufacture — Only a small amount of Tributyl Phosphate is required — usually less than 0.1% by weight based on the solids, depending on the application involved. Thus, a minimum of Tributyl Phosphate remains in the final product with no residual odor. Because of its high efficiency, Tributyl Phosphate is the preferred anti-foam in the paper industry.

tributyl phosphate

ANTI-FOAM AGENT

Tributyl Phosphate is an odorless, colorless liquid, is miscible with most common organic solvents, and is a good solvent for a variety of other materials. It has a surprisingly low melting point for such a high-boiling liquid.

for synthetic latex paints

Addition of a fraction of 1% (based on solids) to this type of paint reduces foaming during application and improves the leveling characteristics of the paint film. Synthetic latex paints sometimes tend to coagulate during application and Tributyl Phosphate minimizes this tendency.

other uses—Tributyl Phosphate has helped solve many industrial foam problems encountered in the manufacture of such products as—inks, textile sizings, casein solutions, water-soluble adhesives, and rubber latex. For further information, write Industrial Chemicals Division, Commercial Solvents Corporation, 17 East 42nd St., New York 17, N. Y.

SPECIFICATIONS

Specific Gravity at 20°/20°C.....0.973 to 0.983

Acidity as Phosphoric Acid, max.....0.05% by wt.

Water, naphtha test.....None

Color.....Water-white

PROPERTIES OF COMMERCIAL GRADE MATERIAL

Boiling Point at 27 mm. of mercury .....177°-178°C

Melting Point.....Below—80°C

Flash Point, Cleveland Open Cup: 294°F

Viscosity at 25°C.....3.41 centipoise at 85°F.....38.6 Saybolt seconds

Dielectric Constant at 30°C.....7.97

Weight per U. S. Gallon..... .....8.13 pounds at 68°F

Solubility in Water..... .....0.6% by volume at 25°C

Solubility of Water in Tributyl Phosphate ....Approx. 7% by volume at 25°C

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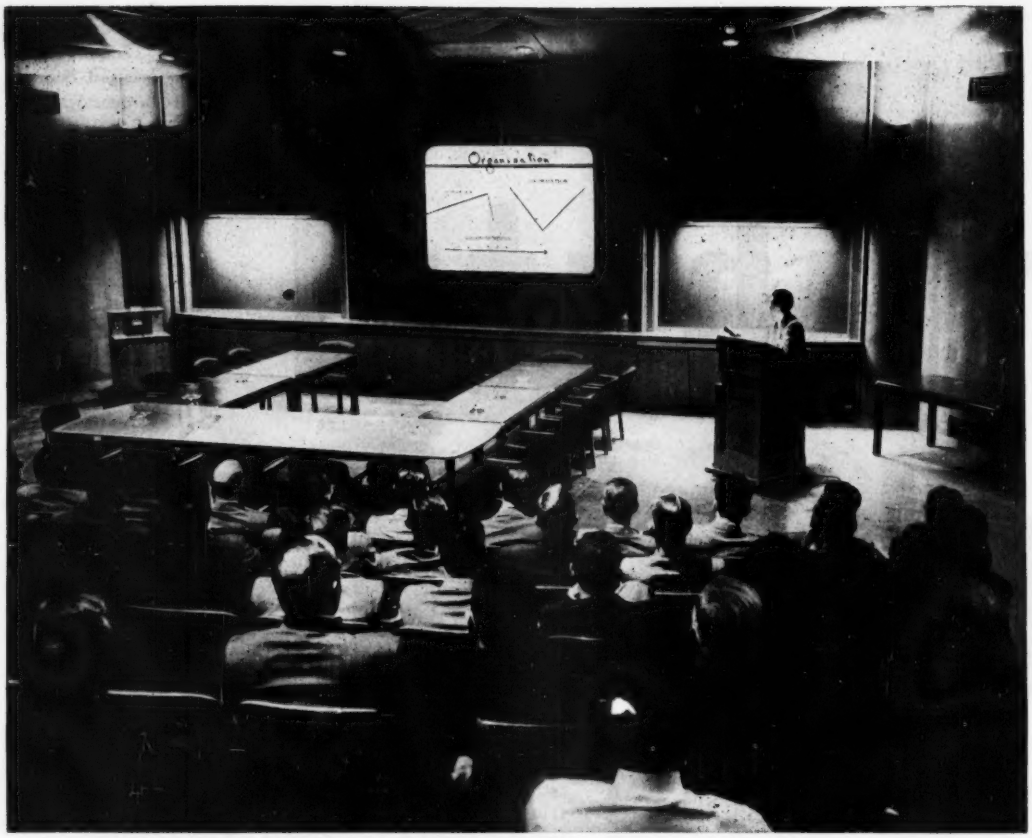
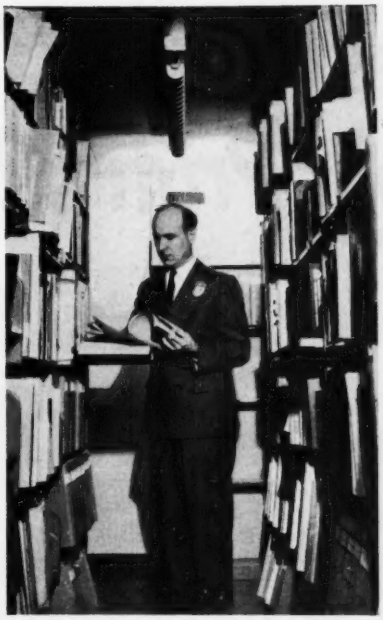


TECHNICAL PERSONNEL at Standard Oil Development's Esso Research Center go back to school as part of the company's program for employee communication. Here, Readability Counselor Robert Gunning gives pointers on how to write understandably.

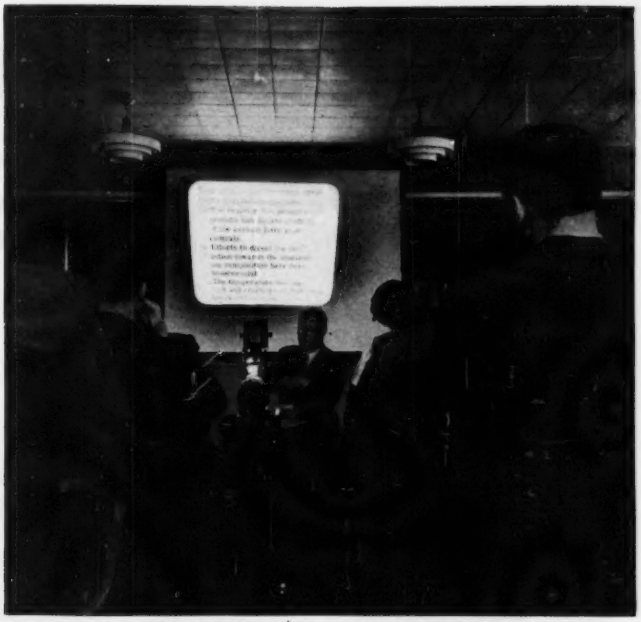
How Standard Builds Pipelines for Ideas

AFTER THE LECTURE, men are asked to prepare a sample of their technical writing for . . .

SPECIFIC ANALYSIS. Counseling sessions with Gunning are scheduled to help on individual problems.



SOME JOBS require much reading. Those who spend 8 hours a week at it may take . . .



READING COURSES. John Ranney of New York University, here using slides, teaches workers how to skim material to learn its essential points.

The three R's of school days are usually considered old-time—not modern—education. Standard Oil Development Co. has just completed two parts of a teaching program for technical personnel at Linden, N.J., which includes instruction in reading and writing.

On the surface, this might seem trite. Chemists and engineers who have gone through college can do both. But SOD's efforts aren't the traditional ones: The writing course stresses simplification; the reading stint, how to scan material for its important points. Third part of the plan is a public speaking course, which will emphasize organization and delivery of material.

At present, all but 200 of SOD's 775 technical people have taken part in the writing program, have spent a total of 4,300 job-hours at it. Thinking behind the course: SOD works for many Jersey Standard affiliates; its reports go to all educational levels. Therefore, plan a report to tell the important things first. Write it simply, using small words where you can.

Only 100 have taken the reading course—those who normally spend at least one-fifth of their time reading. Teaching better reading habits, SOD reasons, makes for efficiency.

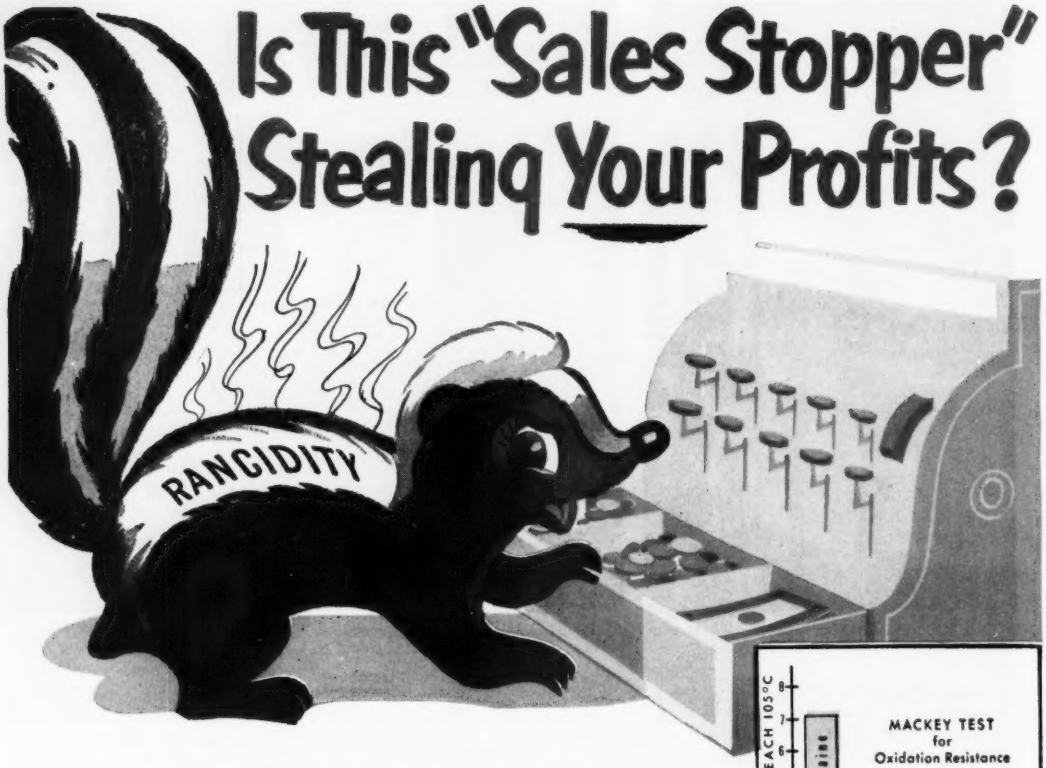
The speech aspect of SOD's work has not been stressed during the last few months, though about 200 have matched 15 hours of their own time to take the course.

In the future, the company hopes to get everyone into the speech and writing courses. The cost, both in hours and money should be worthwhile, SOD officials reason, in helping inter- and intra-company communication.

BETTER SPEAKING is furthered both in formal courses and with such speaking aids as SOD's electrically operated lectern.

CONFERENCES, oral reports, written reports—all should benefit, says SOD, through its three-way program.

Is This "Sales Stopper" Stealing Your Profits?



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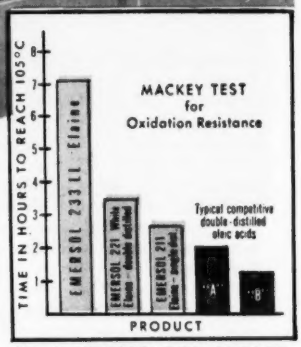

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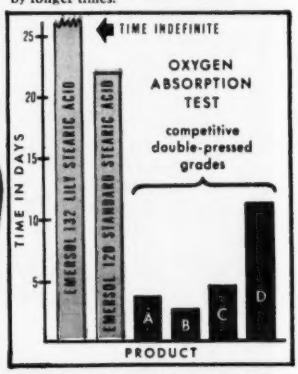

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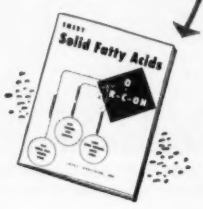

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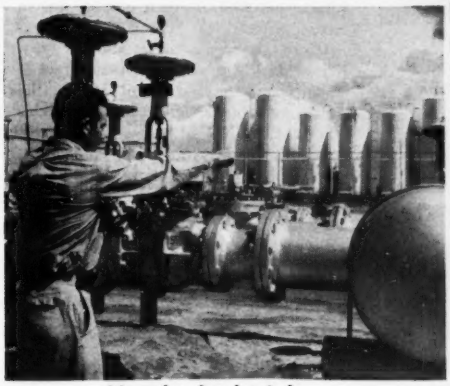
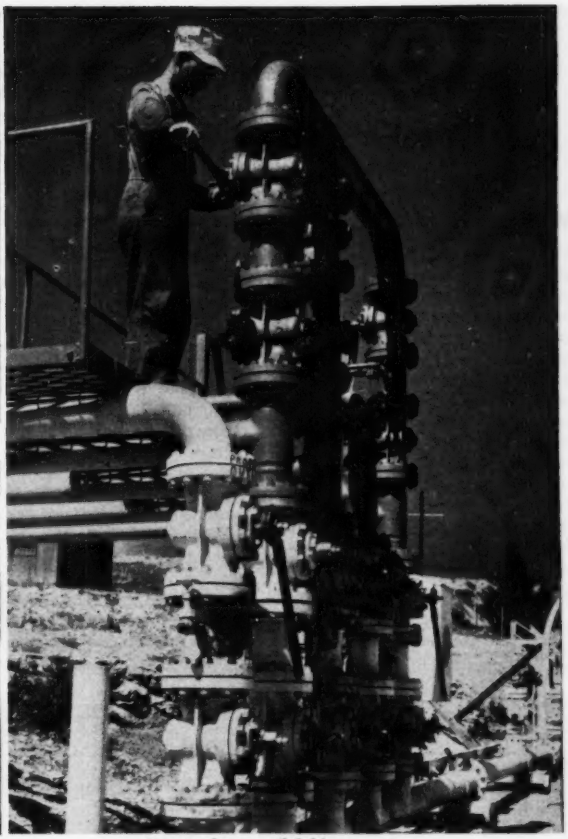
Cooking with gas . . .



Means less for chemicals . . .



Despite bigger oil-field reserves.

C W Report

Gas Chemicals—Decline and Fall?

Today's picture: Competitive demand from household consumers is taking natural gas out of the cheap-raw-material category.

Forecast: Continuation of this trend indicates a squeeze play on available supplies of natural gas earmarked for the petrochemical industry.

Result: Present and future participants in the cheap gas bonanza should figure on a reversal of the natural gas vs. coal balance within a decade.

Roger Williams, Jr.,* Herman W. Zabel,† and Edward Tarnell*

The stampede toward natural gas as a domestic fuel may well snuff out the well-advertised, long-time boom in gas-derived petrochemicals. This will not occur tomorrow. Nor will it happen overnight. But all signs point to trouble in the next decade. The important contributory factor is that natural gas used as a domestic fuel can command a much higher price than chemical manufacturers can afford to pay. Thus, those responsible for choosing plant sites and processes had best cogitate on a return to coal as a source of carbon for organic chemicals, hydrogen or fuel.

* Roger Williams, Inc. † Chemical Enterprises, Inc.

Consumption Trillion cu. ft.	1935	1945	% Inc.	1950	% Inc.	Total % Inc.
Domestic & Commercial ...	0.41	0.84	107	1.59	89	288
Gas & Oil Companies	0.72	2.16	200	3.05	41	324
Industrial	0.85	1.81	113	2.80	55	230
Total	1.98	4.81	143	7.44	55	276

WHO WANTS IT?

The possible classifications of natural gas uses are legion. But there are three major groups of consumers: (1) domestic and commercial fuel outlets, (2) gas and oil companies for internal consumption, and (3) industrial consumers using it as fuel or chemical raw material. Here care must be taken if a true impression of the rate of growth of the various categories is to be obtained. As can be seen from the comparisons in the table above, it is only within the last five years that the growth in use of natural gas for domestic and commercial heating has hit its real stride.* Over a fifteen-year period the growth in each classification has been roughly the same.

The why of this speedup in the increase of natural gas for home heating is quite simple. During World War II there was no steel for the needed pipelines. And there was little experience in the long-distance big-inch pipelines that have since become so common. The success attending the conversion of the "Big Inch" from a crude oil carrier to a natural gas carrier at the end of the war set off a pipeline building spree that is now carrying Texas natural gas from New England to California and all points between.

Even the Pacific Northwest is being considered as an additional component of this orbit as a number of companies reactivate old plans to move Texas gas some 2,000 miles into the tall-timber area. This is a result of the Alberta Conservation Board's decision to keep most of its gas at home, stopping for the moment the heralded development of Alberta as a gas exporter. The Northwest states had been considered as a logical major market for the Canadian gas.

More to Come: Admittedly the pipeline building spree has proceeded fast up until the present time. But will it continue? It will, and here is why.

(1) The domestic or commercial customer likes natural gas. There is no need to worry about deliveries or stockpiling. Gas is clean with no residual ash and initial furnace costs are low. Up until now probably the most important reason is the continuous low and nearly unchanged cost of gas in comparison to competitive fuels (Chart 1). Expressing it another way, since 1935 the average retail price of coal has increased about 110%, fuel oil about 118%, and gas only slightly over 2%.

(2) The utilities, who must distribute the gas, like natural gas. They were and are being faced with the problems entailed in the handling of new customers, preferably with present distribution facilities. In the period 1935-1950 population increased about 23%. But gas customers increased about 67%. With the advent of natural gas the companies were able to make the old distribution systems meet the new demands. Reason: Manufactured gas carries about 550 Btu per cubic foot while natural gas carries 1,000 Btu in the same volume. Thus a switch from manufactured to natural gas almost doubles the capacity of the existing distribution system in terms of the quantity of heat that can be delivered. The concomitant savings add up to millions of dollars in capital expenditures that would otherwise be required to enable the present systems to meet the expanded demands. This changeover is still proceeding apace and probably will continue until most manufactured gas plants are reduced to a standby status.

(3) The pipeline companies, which transport the gas from the fields in the Southwest to other parts of the United States, like natural gas. Demand for natural gas by domestic consumers has made them big business. Since 1947 domestic users have contributed over 54% of the revenues of all gas transmission companies—for 30% of the gas volume.

(4) The gas producers welcome the growth of the long-distance natural gas pipeline companies because they can afford to collect the gas from many fields and wells whose output

* It has taken a long time getting there. Three thousand years ago the Chinese were using bamboo drill pipes and transmission lines for utilizing natural gas as a convenient source of heat.

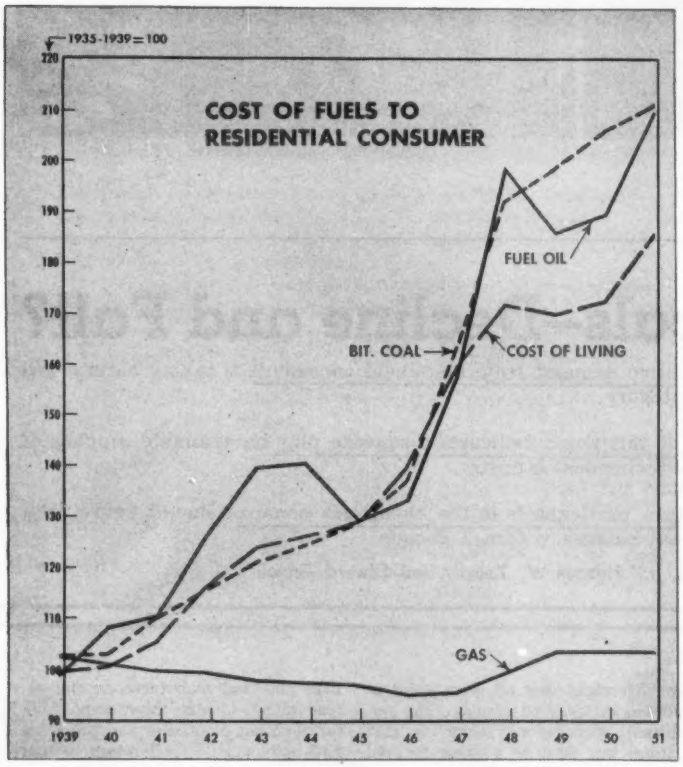


CHART 1

Case history
no. 37

The Case of the Industrial Site that Moved!

The answer to another actual chemical plant location problem

Plant executives and engineers of a large industry recently made "on-the-spot" surveys of half-a-dozen potential plant sites, many miles apart. And they did it in a matter of minutes . . . without ever leaving their offices!

These widely scattered industrial sites were literally "moved" to the desks of these men in startling three-dimensional clarity. So effective was this method that engineers were actually able to estimate grading and clearing requirements in addition to obtaining valuable information on topography, road and railroad locations and other facts vital to proper site selection.

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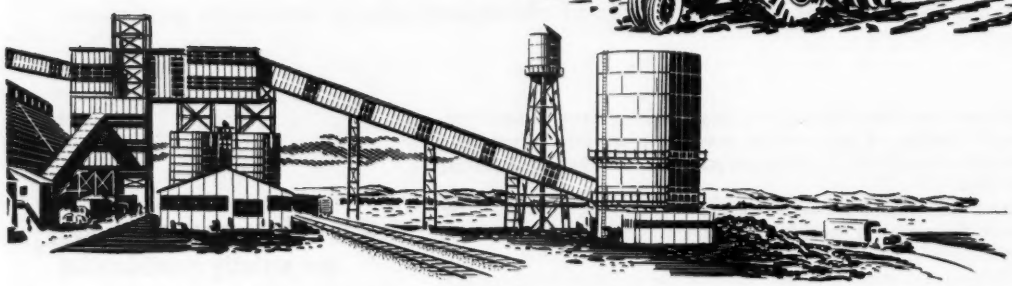

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could not otherwise be marketed. This has meant and will continue to mean increased well-head gas prices. This trend is pictured on Chart 2 which shows the upward trend in the prices paid for natural gas at the well-head by one of the largest integrated companies in the natural gas business. Another example is a leading petroleum company whose average revenue per unit of gas marketed has increased 57% in the last five years despite the fetters of long-term contracts.

(5) State and Federal power commissions like natural gas. It alleviates the headaches that John L. Lewis has caused by his frequent interruption in the supply of raw material for manufactured gas plants.

Such unanimity of opinion indicates that a belief in the continued growth of natural gas consumption is not unfounded. Its distribution may be hampered by the lack of steel during the next few years, but the upward trend will be resumed when the required steel again becomes available. Then the only limiting factor for some time to come will be the gas supply.

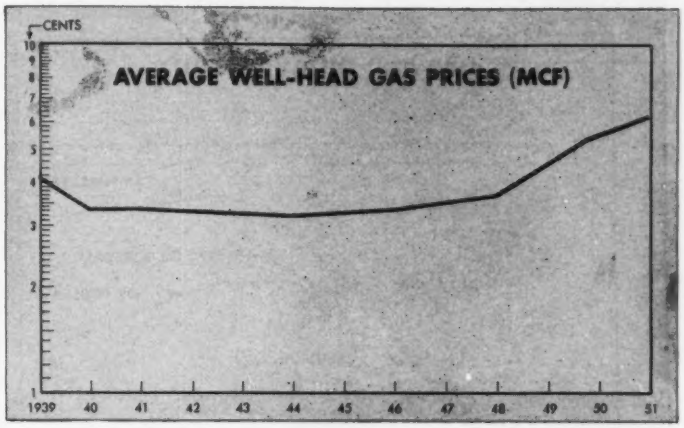


CHART 2

HOW MUCH GAS?

The exact quantity of natural gas that is being produced today is an extremely nebulous quantity since no one knows how much is flared or vented. One can fly from Corpus Christi, Texas to Houston and never be out of sight of a gas flare. Recently one of the authors counted thirteen at once.

Knowledge of the quantity of natural gas consumed for home, commercial, gas and oil company, and industrial use is reasonably accurate. This amounted to 7.44 trillion cubic feet (TCF) in 1950 (these are preliminary figures of the Bureau of Mines and subject to revision). The Bureau knows of 0.70 TCF that was wasted in 1950, raising the known production to about 8.14 TCF. But the Bureau admits that its waste figure is far too low. Another indication of the inadequacy of the gas-flared statistic is provided by a recent report of the Texas Railroad Commission, the group that controls gas and oil production in Texas. The chairman recently pointed out that between January 1951 and July 1951 the oil produced in Texas increased 8.6% while the volume of gas reported as flared increased 137%. With these admittedly inferior data as a base, total natural gas production has been assumed to be 10 TCF in 1950 of which approximately 75% was utilized.

The Next 25 Years: The next question is, What is the total natural gas production rate that can be expected over the next 25 years?

This can perhaps be estimated most reliably by utilizing the parallelism between natural gas and crude petroleum production. This is shown in Chart 3. Because of this correlation we can utilize the far more accurate forecasts of crude oil production rather than the sketchy long-term forecasts of natural gas production.

An estimate in which the forecasts of several persons and companies are collated is shown in Chart 4. (R. A. Solliday, Standard Oil Co. of Ind.; L. F. McCollum, American Petroleum Institute; A. I. Levorsen, United Nations.) Based on 1950 production of crude oil and our present estimates of a total natural gas production of 10 TCF, total future natural gas production can be predicted.

The dotted curve on Chart 5 shows that we are not alone in our estimate of future natural gas availability. This curve represents an average value of the upper and lower limits of availability as recently estimated by the National Petroleum Council. Also, the points marked A and B on Chart 5 represent two predictions that were recently made by the Bureau of Mines in its study of future energy supplies.

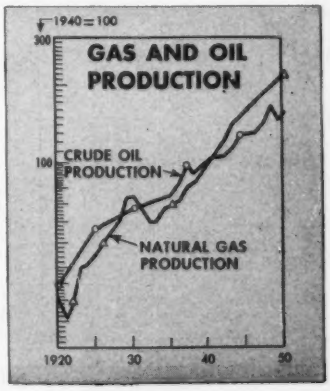


CHART 3

WHERE WILL IT GO?

Now that we have an estimate of the amount of natural gas that will be produced, the next step is to find out where this gas will go. This can perhaps best be done by assigning priorities to the three classifications of consumers—(1) home and commercial; (2) gas and oil companies; (3) industrial consumers—that were previously noted.

First priority must be assigned to the domestic and commercial user. For one, they are paying and will continue to pay the highest prices (Chart 6). For another, as soon as the local gas companies complete their expansion plans for underground storage facilities near consuming areas, "base load" industrial consumers will no longer be welcome except on a competitive basis with the domestic market. And industrial consumers will not welcome the increased prices that this will bring.

The growth of underground storage facilities has been phenomenal. Just one organization, the Columbia Gas System, has increased its capacity fivefold (to over 150 billion cu. ft.) since 1943. That this is just the beginning of a groundswell is indicated by the American Gas Association's estimate that the gas utility companies will spend more than $100 million in the next few years for additional underground facilities.

But there is still another reason for

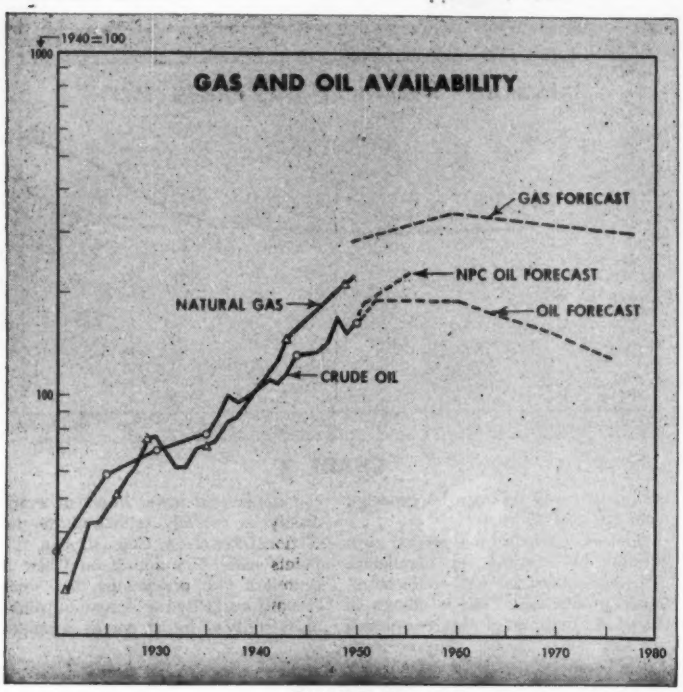


CHART 4

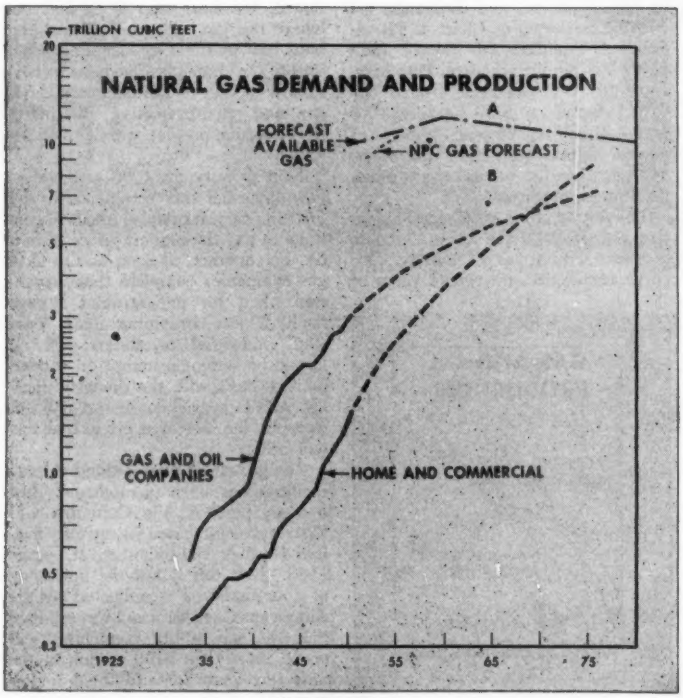


CHART 5

the priority assigned domestic consumers. During periods of gas shortage the State and Federal Power Commissions shut down industrial plants even in time of war when their products are vital to the war effort. For example, the Power Commission many times has cut back production at International Nickel Co.'s large Huntington, W. Va. plant even during World War II when the production of nickel products was of vital importance. Also the Du Pont methanol plant at Orange, Texas, has suffered from curtailed production during cold snaps in the last two winters when the gas was required for domestic use. This occurred even though the plant is located in the heart of the Texas gas-production area. In an industry such as the chemical industry, which has the high fixed charges of a massive capital investment, a prolonged cold snap might mean the difference between red and black figures on the balance sheet. Moreover, industry has little if any recourse from such orders.

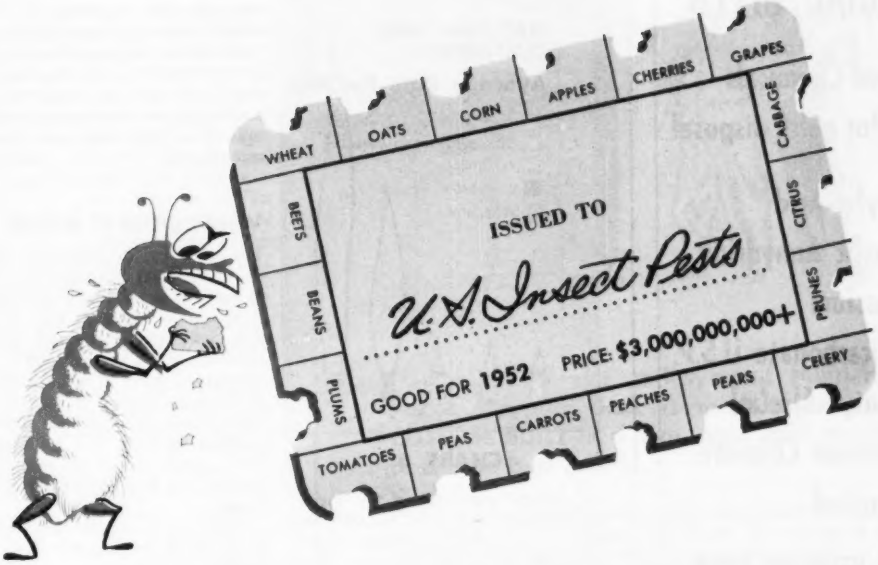
Next in Line: Priority almost equal to that given to domestic consumption must be assigned to gas and oil company use. Certainly this is true wherever the pipeline system is so set up that natural gas is used to drive compressors or gas moving equipment. Also it will continue to be used for repressuring to increase recovery of liquid hydrocarbons. After all, the gas and oil companies still have some discretion as to how the gas is to be used and they have the gas in their possession before any other user.

Anything that is left will then be used by the only other consumer classification, the industrial user, including the manufacturers of petrochemicals. As low man on the totem pole, they are in a vulnerable position.

Can't such a consumer be protected by a long-term contract? Only to a degree. Public utility control bodies have nearly always ruled that the public need for home heating was paramount.

There is, of course, the possibility of buying the total output of a given gas field and not permitting it to be connected to a pipeline serving domestic consumers. One petrochemical manufacturer, indeed, has adopted this program.

But there is danger in this procedure that transcends the usual problems associated with purchase of a piece of property. At times gas fields fail in a most unpredictable manner. This is what happened to McCarthy's gas reserves in Texas and caused the insurance companies to step in to try



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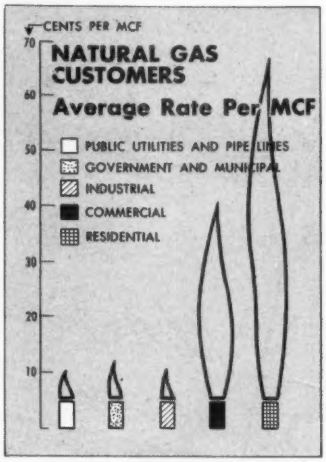


CHART 6

and salvage something of the wreckage. Similarly the fabulous Oriskany field in West Virginia failed almost overnight. Today the field is of little consequence as a gas producer. Another ever-present problem is that of defining the limits of a field, with the possibility that an owner may suddenly find that his "field" is a portion of a field that is already being "mined" for domestic consumption.

The Forecast: Chart 5 indicates that natural gas production may possibly reach 12 TCF per year by 1960. This is well and good, but what portion of this will be required by each of the three use classifications? The other curves on the chart indicate the projections of requirements for the first two priority uses (home and commercial, and gas and oil company). This indicates that the demand for these two uses alone just about equals the *total* gas supply by that year. Any projection of this type is only as good as the basic information and the assumptions made to derive it. In the projection of home and commercial uses it was assumed that the per capita occupied dwellings would continue to follow the straight-line trend of the past fifty years. Secondly, it was assumed that the number of centrally heated dwellings would continue to grow at the present rate and that gas would eventually capture about 60% of the home heating market.

In the projection of gas and oil company uses it was assumed that storage and transmission losses (including consumption for pipeline compression) would increase at the same rate that production increases. Also it was assumed that more gas would be used as a boiler fuel. However, the rate of growth for this use should slow up as price edges up and coal becomes more economical. Finally it was assumed that the demand for crude oil and the requirements of public service commissions would sustain at a high level gas needs for repressuring.

WHAT DOES IT MEAN?

The meaning to industrial consumers of the data presented in Chart 5 in terms of gas available for their use, is shown in Chart 7. This indicates that industrial consumers may be pinched for gas by the 1960's. An indication of thing to come is the new plant which Alcoa is erecting at Rockdale, Texas. Here electric power for alumina smelting will be generated from lignite instead of natural gas—right in the heart of natural gas-rich Texas.

But power is not the only possibility of the Alcoa development since a low-pressure carbonization of the lignite is planned as a first step. The char is to be used as the plant fuel, and the co-product tars, upon hydrogenation, will provide an excellent source of aromatic hydrocarbons.

Any forecast of natural hydrocarbon supply is fraught with danger. Witness the red faces connected with the continual crying of "wolf" anent our petroleum supplies. In this connection it should be noted that the United States has at last become a large importer of crude oil. Obviously any such forecast will not turn out to be correct in absolute terms. Certainly industrial uses of natural gas will not go to zero by 1965. But, barring another "Texas," it should be well along on the downward side of the

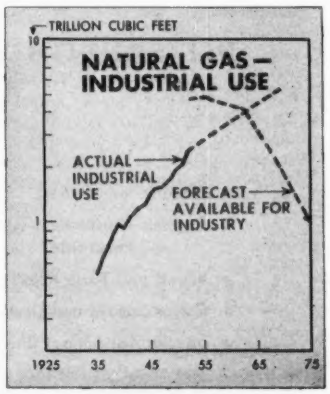


CHART 7

curve which will eventually represent its growth and decline.

Be that as it may. The data certainly do indicate that there will be changes in the relative economics of coal and natural gas in the next 15 years. In fact there is some indication that by that time the manufacture of methane from coal may be cheaper for industry than use of Texas natural gas. Successful pilot tests have been carried out at the Institute of Gas Technology for the production of "substitute" natural gas. Also, Carbide and Carbon Chemicals Co. has built a multi-million dollar pilot plant at Institute, W. Va., to hydrogenate coal. Koppers Co. also plans to pilot coal hydrogenation at its new research center in Verona, Pa.

That close study of this over-all possibility is being undertaken by the natural gas companies is indicated by a statement of C. R. Breck of the Southern Natural Gas Co. He declares, "... a price of 58 cents [per M cu. ft.] on the Monongahela would certainly not be prohibitive." Such a gas would be made from a low temperature char by the Lurgi process.* This type of plant is far too costly today. However, it would seem, that from the many pilot plants now being operated or on which slide-rule computations are being made, one or more processes will emerge which can produce "substitute" natural gas from coal at a much lower figure.

SUMMING UP

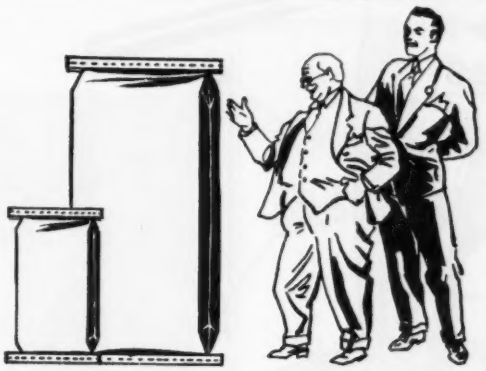
The net result of this long-term look at natural gas indicates three clear conclusions:

(1) Chemical companies planning new units that are to be based on natural gas should situate and design these plants for eventual economic conversion from gas to a solid fuel raw material.

(2) Companies whose processes are today based on natural gas should begin research and economic studies to clear the way for a future shift to a solid fuel raw material. Examples: recovery of ethylene from coke oven gas; production of chemicals via coal hydrogenation, Fischer-Tropsch, or variations thereof.

(3) Commercial production of methane from coal may become an actuality in the not-too-distant future. Therefore, research and economic studies on solid fuels gasification, gas purification, and methanation should be intensified.

* Steam and oxygen are simultaneously introduced into a generator, which contains a fixed bed of coal. The pressure may be as high as 300 psi., the exact composition of the gas varying with the pressure being used.



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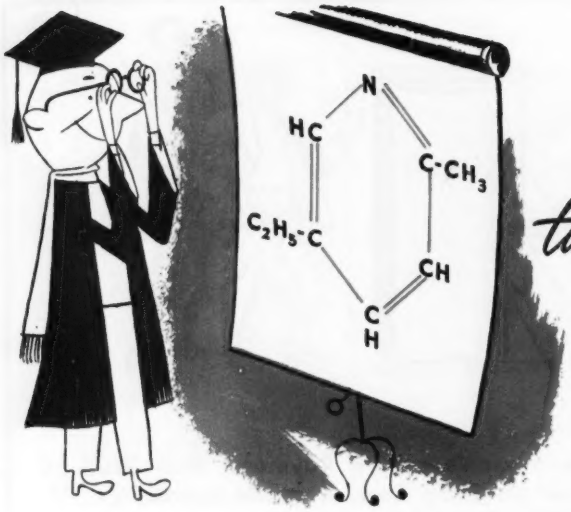

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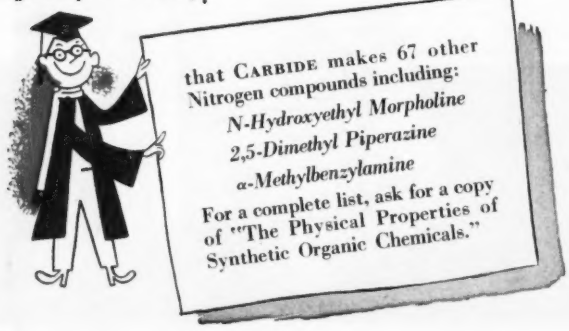

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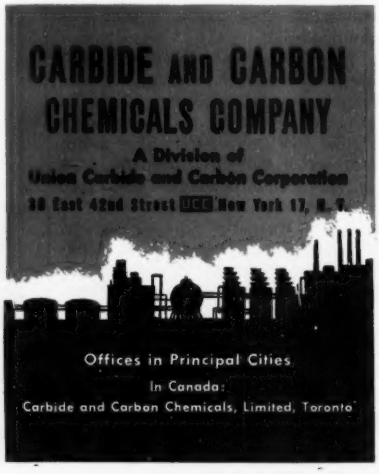
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Solid Ground For Progress

Soil stabilization by chemical methods, today more than ever, is the object of a major industry research effort and the subject of some well-justified chemical product promotion.

New developments, like Monsanto's Krilium, promise immediate reward to agriculture; but progress in construction applications has suffered from misconceptions.

Here's the true nature of the problem, one logical approach to its solution.

"The enemy is often less to be worried about than the mud." That time-honored military axiom, bitterly confirmed during the construction of the celebrated Burma Road of World War II, rekindled research interest in an old and durable problem—soil stabilization.

Approaches to the problem, from the military standpoint, have been varied, ingenious and—for the most part—unsuccessful. Freezing, thermal fusion and mechanical compaction are representative cases in point.

There are, of course, two aspects of the problem: One, soil stabilization, is concerned solely with improving the load-carrying capacity; the other, soil conditioning, emphasizes improvement of tilling characteristics, minimizing erosion.

Researchers learned early that chemicals were the best answer to the twin problems; and they have come up with calcium acrylate and chrome-lignin for stabilization, hydrolyzed polyacrylonitrile (Krilium) to meet agricultural needs.

But while the chemical line of thinking proved basically sound, its application to practical road-building and construction problems ran up against a mental road-block. In nearly all of this research the initial hope was that some magic chemical would be found, which in exceedingly small quantities, would transform mud into the equivalent of a paved highway.

This seems to be the layman's concept of chemical soil stabilization. It should be possible, they think, to go out into a sea of mud, inject a pound or two of chemical and instantly have the mud surface turn into concrete that will support a ten-ton truck. Others envision the same result from

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dusting a small quantity of chemical over the mud or spraying it from an airplane.

Even many chemists and engineers appear to think more or less seriously in such terms.

Clear To the Heart: To get at the heart of the issue, learn its true nature and potentially fruitful lines of research, CW this week called on two experts; in each case Cornell University's Benjamin K. Hough and Julian C. Smith, coinventors of the new chrome-lignin stabilization process.

Here are their candid views:

"Chemistry is wonderful, but it isn't magic. Possibly someday a wonderful product will be developed, and a pound of it will be enough to build a road across a bog. But all evidence to date is against it."

Soil conditioners, on the other hand, come pretty close to magic in erosion control, improving soil structure, increasing permeability—but they're not designed to alter materially the load-carrying characteristics of the soil. Their forte, of course, and the major market to which they are directed, is in the field of agronomy.

Failure to recognize the important difference between stabilizers and conditioners has led to confusion in the minds of many researchers. Some chemicals do one; some, the other. At Cornell most of the work has centered on soil stabilization—modifying unstable soil so that it is a suitable material for engineering construction.

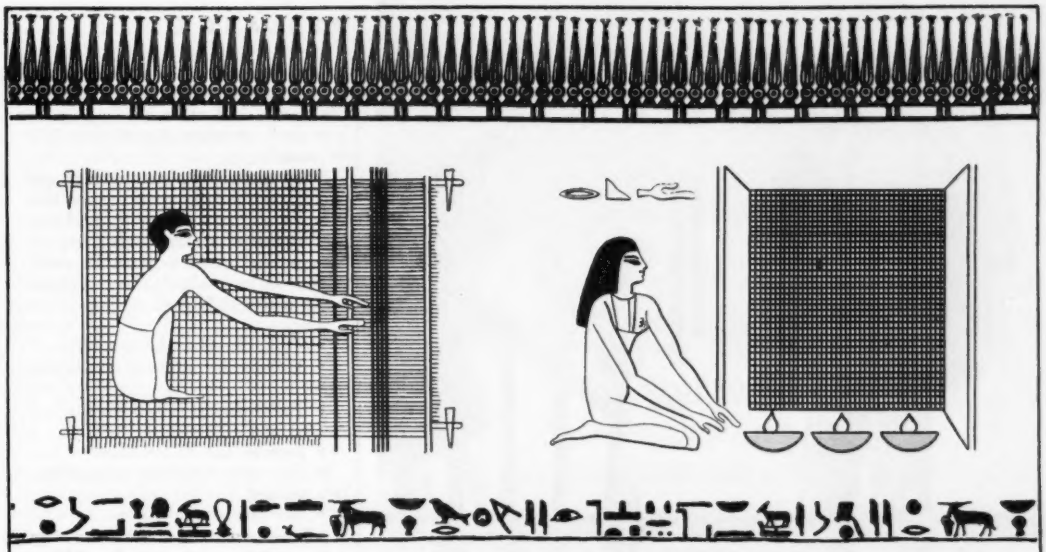
"Extensive research . . . both at Cornell and elsewhere, has led to the conclusion that as far as we can see at present, for a chemical additive to stabilize soil effectively in the engineering sense, it must be present in fairly large quantities; between about 3% and 10% of soil weight.

"And very few chemicals are known

* Electrical potential difference between two phases of a colloid. In this case, between water and colloidally dispersed soil particles.

Research Takes the Stump

TEMPORARILY TRADING the laboratory bench for the lectern, Lederle Laboratories Division (American Cyanamid Co.) researcher Bernard R. Baker is taking the story of Lederle research to the hinterlands. In a swing of six midwestern universities, Baker is describing the work that only recently (CW, Jan. 26) produced a promising new synthetic antimalarial. More active than quinine, the new drug is a direct outgrowth of the discovery of a potent antimalarial alkaloid in a garden-variety hydrangea plant.



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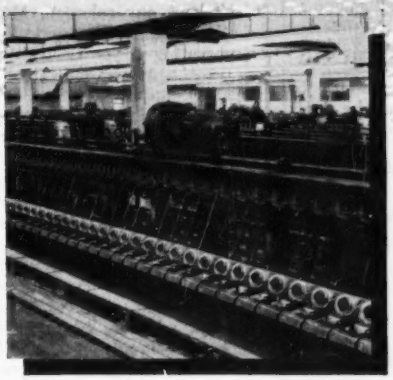

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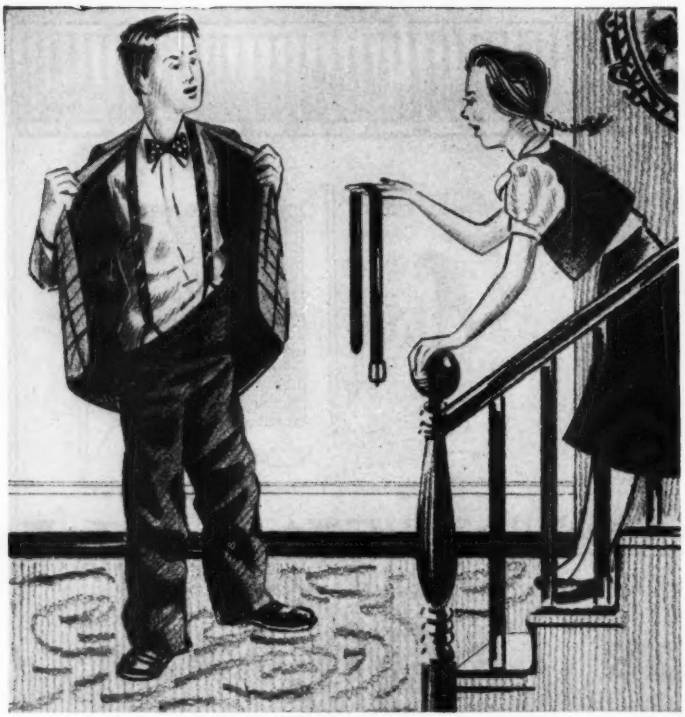

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that are effective with clays, even in concentrations of 5% or 10%. Almost all plastics and other bonding agents just don't set when diluted with 95% of mud."

The Factors: It's plain to Hough and Smith that there's no easy, one-shot solution to the stabilization problem. And in lieu of a magic agent, any attack on the problem must be predicated on an understanding of some basic practical factors.

They are:

- Type of soil to be treated
- Method of applying stabilizing agent
- Performance requirements of treated soil
- Permanence of treatment
- Ease and reliability of stabilization method
- Rapidity of application

All are important. But the last two—easy, reliable **methods and rapidity**—are vital to the military. Any workable method, to be of tactical value, must be within the scope of untrained troops operating on any soil under the most adverse conditions. For rear-area construction and for civilian use, more control by trained personnel, heavier equipment and slower methods can be used.

A closer look at several of these practical considerations reveals in detail just what researchers are up against. Type of soil to be treated is a good illustration. Soils that give the most trouble are loose, dry beach sand and wet, soupy mud. Dry sand will carry heavy loads if confined, but doesn't have any cohesion. Mud, on the other hand, rates practically zero for supporting power. Obviously each case presents its own individual headaches.

How to apply the stabilization agent turns out, in like fashion, to be a stickler. There are only two distinct methods: penetration and mechanical mixing. But both must be thoroughly qualified, neither is suitable for all-purpose duty.

Penetration, whether by gravity or pressure, is limited to loose, sandy soils and liquid additives. And not only must additives be liquids—they must be thin liquids; viscous fluids as a rule don't penetrate even coarse sand more than a half-inch.

Mechanical in-place mixing, at this time, is also limited to fairly dry soils. Existing road-stabilizing machines do a pretty good job of distributing a dry powdered additive into dry dirt. They fall down, however, if the additive must be put into wet soil—as is the case in most chemical stabilization methods. And to further compli-

cate matters, machines with the close tolerances needed to mix heavy soils cannot tolerate the occasional rocks that are inevitable in these soils.

Another reason for not stabilizing mud directly is that compaction of the treated soil is essential for good results. Dry soils can be compacted very effectively. Mud cannot. It doesn't offer enough reaction to the weight of the roller.

Secondary Objective: Thus, in the opinion of Hough and Smith, as long as soil solidification is thought of exclusively as a method of constructing a continuous surface layer or substitute pavement, it cannot solve the chief military problem—what to do when men and vehicles are already bogged down in the mud.

Consequently, most research to date has been aimed at a secondary objective—a way of treating soil under favorable conditions to insure against failure in rainy weather. The idea is to form a strong, impervious surface layer to protect the soil below. But here too, it's not easy. Development of shrinkage cracks after treatment, the need for thorough mixing and blanket-coverage of all potential trouble spots militate against successful achievement of the goal.

Even if the fair weather job is licked, the basic mud problem remains. What, then, is the answer? According to researchers Hough and Smith, it's to be found in conventional practice for treating unstable soils.

They point out: "When a contractor finds his haul roads bogged down in mud, he imports gravel, cinders or some other aggregated water-insoluble material, fills in the unstable area and builds himself up out of the mud. In military construction the same procedure is followed where possible. The trouble is that in many places there is no gravel or other aggregate.

"And that's where the concept of making your own aggregate comes in. Chemically-stabilized soil could be briquetted in a mobile plant operating close to the muddy area. Not-too-wet soil from a borrow pit would be excavated, the occasional rocks crushed, the chemicals mixed in and briquets made from the mix by compact truck-mounted units.

Within Minutes: "Made with chrome-lignin additive, the briquets harden within minutes to a waterproof aggregate that can be easily crushed into angular rock-like pieces. They're not as strong or abrasion-resistant as real rocks, but they should be entirely adequate for fill—especially temporary fill.

"The briquets could be used almost

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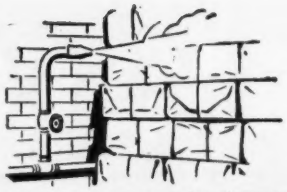
PROPER STORAGE OF EMPTY BAGS

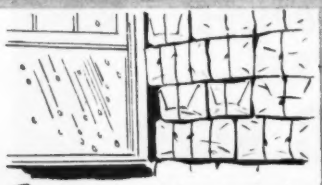


1. Let steam escape in bag storage room to keep air and bags humid. Keep a humidity indicator in the storage room and check it frequently. Always leave aisles or spaces between stacks of bags to allow circulation.

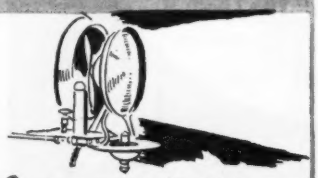
2. Store bags on dunnage, away from floor, and keep floor wet so moisture can be absorbed into air. A relative humidity of about 50% at warm temperature is best.

3. Drill small "needle" holes in horizontal water pipes. Hang cloths over holes. Air absorbs moisture from wet cloths.

4. Hang wet cloths over edge of water barrels. Cloth absorbs water and air absorbs moisture from cloth. Keep barrels well filled.



5. Open windows on damp or rainy day. Damp outside air will circulate in the bag storage room. Multiwalls are strongest when moisture content of the paper is about 6 or 7%.



6. Use commercial humidifying apparatus. Many types of commercial humidifiers are available with capacities to suit individual requirements.

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immediately in muddy areas or stockpiled. Only unstable areas are treated and as much aggregate applied as is needed."

Dry sand also is amenable to the chrome-lignin treatment. In the words of the Cornell team: "Beach sands can be stabilized by penetration methods using the chrome-lignin chemicals in liquid form. The reactants—sulfite waste and sodium bichromate with minor amounts of accelerants or retardants—give a water-thin solution which changes rapidly to a stiff gel.

"It's possible to penetrate dry beach sand to a depth of four inches by pouring the chemicals on the surface. A tough, rubbery surface layer forms within a half-hour. A beachhead, for example, could be stabilized with chemicals pumped from landing craft tanks and sprayed over the sandy area. No construction equipment in the usual sense would be needed."

Smith and Hough's arguments are convincing, but proof of any method's practical value can only come from the field. By their own admission, "for chemical stabilization to be attractive for any purpose, it must be as good as, and usually better than, other ways of accomplishing the desired result.

"It's entirely possible to make conditions worse rather than better, since in much field construction the desired result cannot be spelled out exactly; laboratory results are of questionable value. Research on soil stabilization therefore takes a lot of time and money since only by extended field tests can the value of any process be established."

•

Cross-Linker: Advance Solvents & Chemical Corp. is just out with a new polymerization catalyst. It's Soligen Rare Earth Napthenate 4%. The new product promotes cross-linking at elevated temperatures, increases hardness of heat-reactive resin films.

Applications: drier catalyst in baked finishes based on pure epoxy resins or combinations of epoxy, urea-formaldehyde, melamine and alkyd resins. With soft oil alkyds, as little as half the amount of rare earth metal can be used to replace the usual amount of cobalt to give an equally effective drier. Increased toughness of film and absence of discoloration are added advantages gained with the new product.

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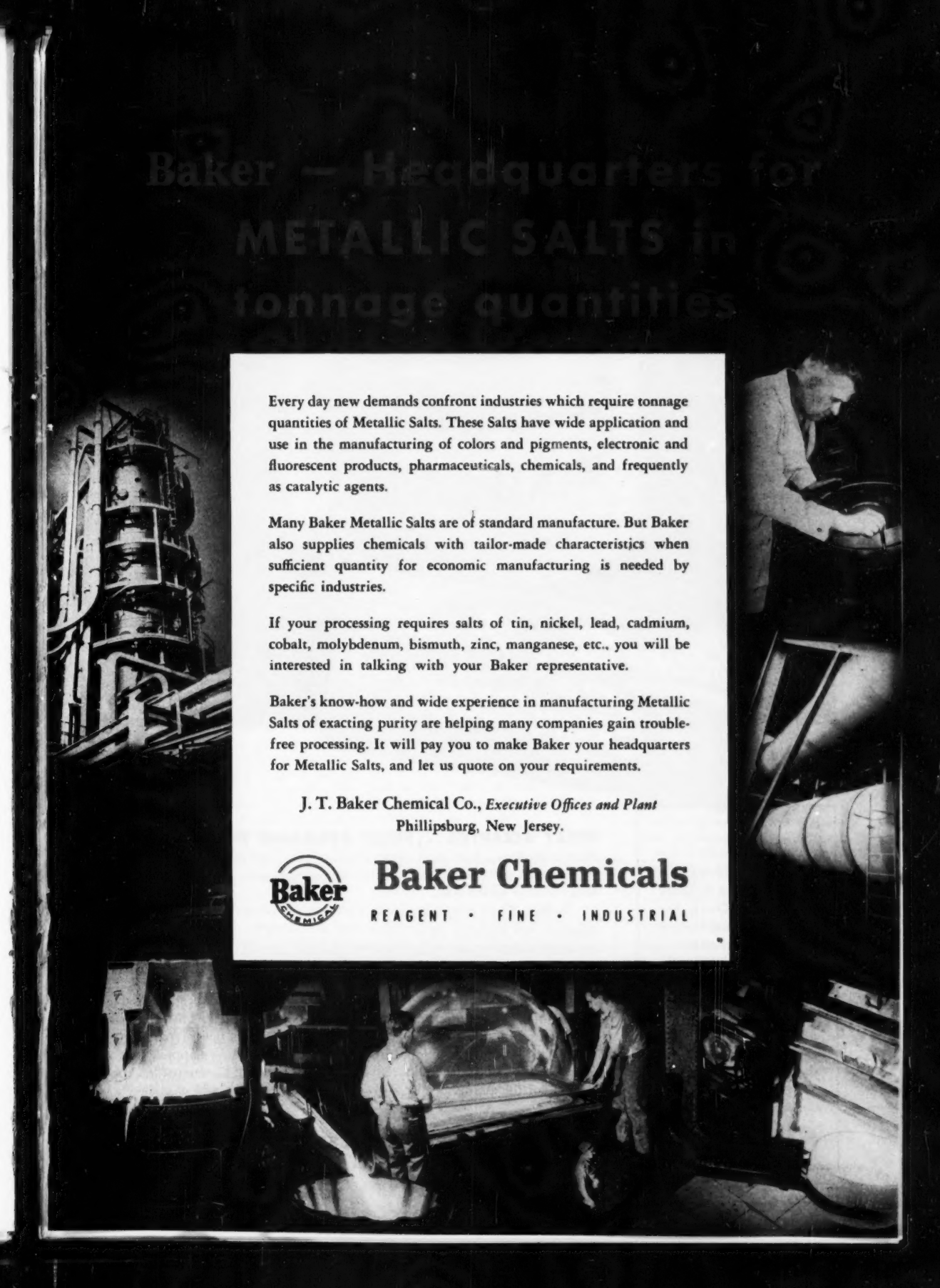
Still Growing: To cope with record demand, Southern Research Institute (Birmingham, Ala.) is launching a major laboratory expansion program.



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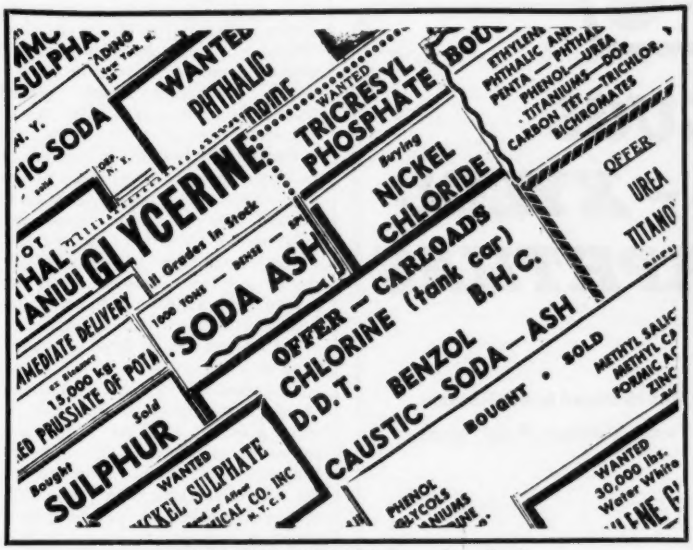

RESELLERS' MARKET:* Remember when?

Merry-Go-Round Slows Down

As the lowering clouds of pessimism swirled down over Manhattan's Peddlers' Row last week, there were the unmistakable sounds of tent pegs being pulled and canvas being rolled. The chemical industry's gaudiest sideshow, the New York resellers' market, had ended its post-Korean season.

Battered old performers and promising newcomers alike were scurrying about, looking for other industrial spots where they could use their special talents—anything to get in out of the rain. And as is customary, the novices who had just been along for a profitable ride slipped off in the gathering dusk to parts unknown.

Everyone, including even the customers who were certain they hadn't got their money's worth, had to agree that it had been a grand show.

Post Mortem: Now that the din and cry of the hawkers and spielers has subsided, the chemical industry is asking itself some searching questions. Who created the resellers' market? What type of people operated in it? Where did they get their merchandise, and what should be the attitude of the industry toward them as individuals, now that they seem to have outlived their usefulness?

Farsighted industry spokesmen are tending to take a step back in an attempt to view the picture with the sweeping gaze of the economist. They report that the effect of the resellers was to create a true market place for the buying and selling of chemicals, a spot where the real value of a commodity could be measured by its price as established by supply and demand.

In today's limited free-enterprise system where most manufactured products move under the careful supervision of the Robinson-Patman Act, price ceilings, and the high percentage of fixed costs in manufacturing, such markets are a rarity. Historically, however, they are one of the key ingredients of a truly competitive capitalistic economy.

"Available Joneses": No market place can operate without buyers; they are the essential element. With considerable justice the resellers can claim that the market, and the high prices, were created by the industry's purchasing agents. They called the tune every step of the way.

According to this theory, most of the cussing over high prices was misdirected. Instead of being fired at the humble reseller, it should have been reserved for the unknown, "damfool buyer" who himself had established such an inflated level by being willing to buy at it. But the joker is that the buyer wasn't being foolish. Nine out of ten times his calculations showed that the increased raw material costs were infinitesimal compared to the penalties of curtailed production.

* The word "reseller" is used in its strictest sense, i.e., an individual who buys a commodity for the sole purpose of making a speculative profit from its resale. Not included are the industrial distributors and manufacturer's agents who act as extensions of the producer's selling arm.

Newspaper classified columns are full of ads for engineers, chemists, technicians. Employment agencies are besieged with requests for trained technical men.

Yet many concerns do not realize that the best source of trained help may lie right within their own organizations.

How can you tap this fertile source?

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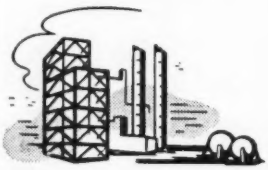

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In short, the resellers were merely implementing buyers' decisions. Their offices, telephones, and memo-jammed pockets were the channels through which purchasing agents argued among themselves as to who should get what.

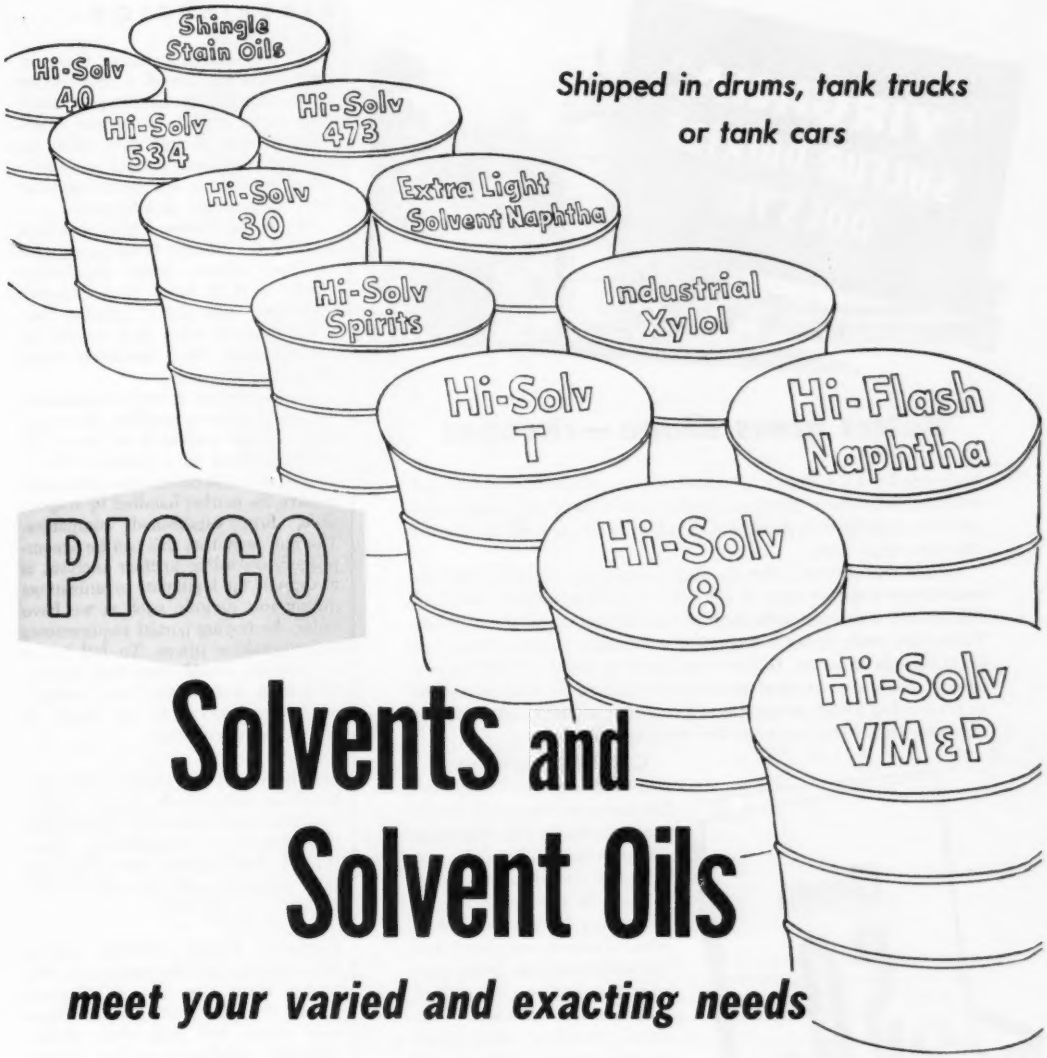
On the Bandwagon: In this job of making a living by providing a means of communication, the resellers made A.T.&T. look like a piker. Simple calculations will show that a car of DDT, properly handled by a few phone calls during a given afternoon, could net a man over $3,000 for his troubles. Such a situation naturally excited a lot of interest among those who were tired of being poor.

Unfortunately for the vast majority of legitimate operators who had or were planning to make a life-time career out of reselling and who carefully held their net to 5% or less for the sake of the long pull, it was difficult for the public to tell which companies were trying to provide a service and which were making a killing. Comparison of prices was no help: They were often the same.

An established import-export firm might, for instance, arrange for a cargo of soda ash at a price determined by a European producer well attuned to the extent of U.S. demand. This might be two or three times the current domestic price, and the importer who had customers willing to pay the high figure would take great pains to prove that only a nominal service charge was being added. A new resellers' price had been established, however, and less inhibited operators with available domestic stocks purchased at manufacturers' prices could unload under this umbrella with a 200% profit.

The difficult trick: The job was to obtain the domestic materials. In a sense, the resellers who made the big money could be classified as "superbuyers." This was the area where most of the shenanigans went on, and their variety was legion. They ranged all the way from buying a purchasing agent's excess stocks (sometimes with a kickback for the management official who arranged the deal) to a "gift" allocation from a sales manager purely on a friendship basis. The net effect of these activities was to disrupt the normal distribution pattern, thereby increasing the buying pressure on which the market was based.

The heartening thing to the outsider is the number of firms who resisted the temptation to cash in on the situation. The cynical observer could claim that they "got religion" in the short recession of 1948-1949, during which the resellers were hard pushed to stay



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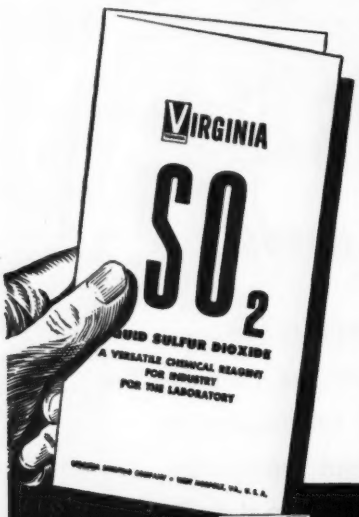

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alive. Whatever the reason, these organizations performed a real service to the industry by handling as much material as possible at normal resale margins, even though they were exposed to the same danger of cancellations, rejections, and price breaks as their high-margin counterparts.

Key to the Future: These men now feel that the industry is unappreciative of their efforts. Since purchasing agents tend to lump them together with their speculative cousins, they are wondering what they gained by not fattening their bankrolls while the getting was good.

Herein lies an industry responsibility, say the career resellers. Assuming that a resale market is an inevitable accompaniment to a period of shortages, it is to the consumers' advantage to have the market handled by responsible, firmly-established companies. The only way that this can be accomplished, according to their analysis, is to support the legitimate organizations during soft periods, such as we have today, by buying partial requirements at competitive prices. To fail to do so, they say, would mean their eventual demise, leaving the next resellers' market exclusively in the hands of mail-drop speculators.

•

British Green: To support the U.S. boom on chlorophylls, import activities have been initiated by The British Chlorophyll Co. (Lincolnshire, England). Fallek Products (New York) has been given the nod for sales in this country.

•

Exception Noted: Fertilizer mixers were happy to see that the recent 15% freight boost was not all-inclusive. Florida phosphate rock and New Mexican potash will both enjoy dollar-and-cents maximums on the amount of increase allowed.

•

Plastic Marriage: Control of Dussi-Wallace Co. (New York), exporter of plastic products, has been acquired by Smith Kirkpatrick & Co. (also New York). This will be the latter's first entry into the plastic field.

•

Island Office: Parke, Davis & Co. has opened a branch, complete with warehouse, in Puerto Rico. Its sales area will include the Dominican Republic, Haiti, and the Virgin Islands.

•

Their Own Home: Commercial Chemicals, Inc., (Buffalo, N.Y.) moved last week into their own warehouse after 36 years of distributing chemicals stocked in public warehouses.

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INTERNATIONAL MINERALS & CHEMICAL CORPORATION
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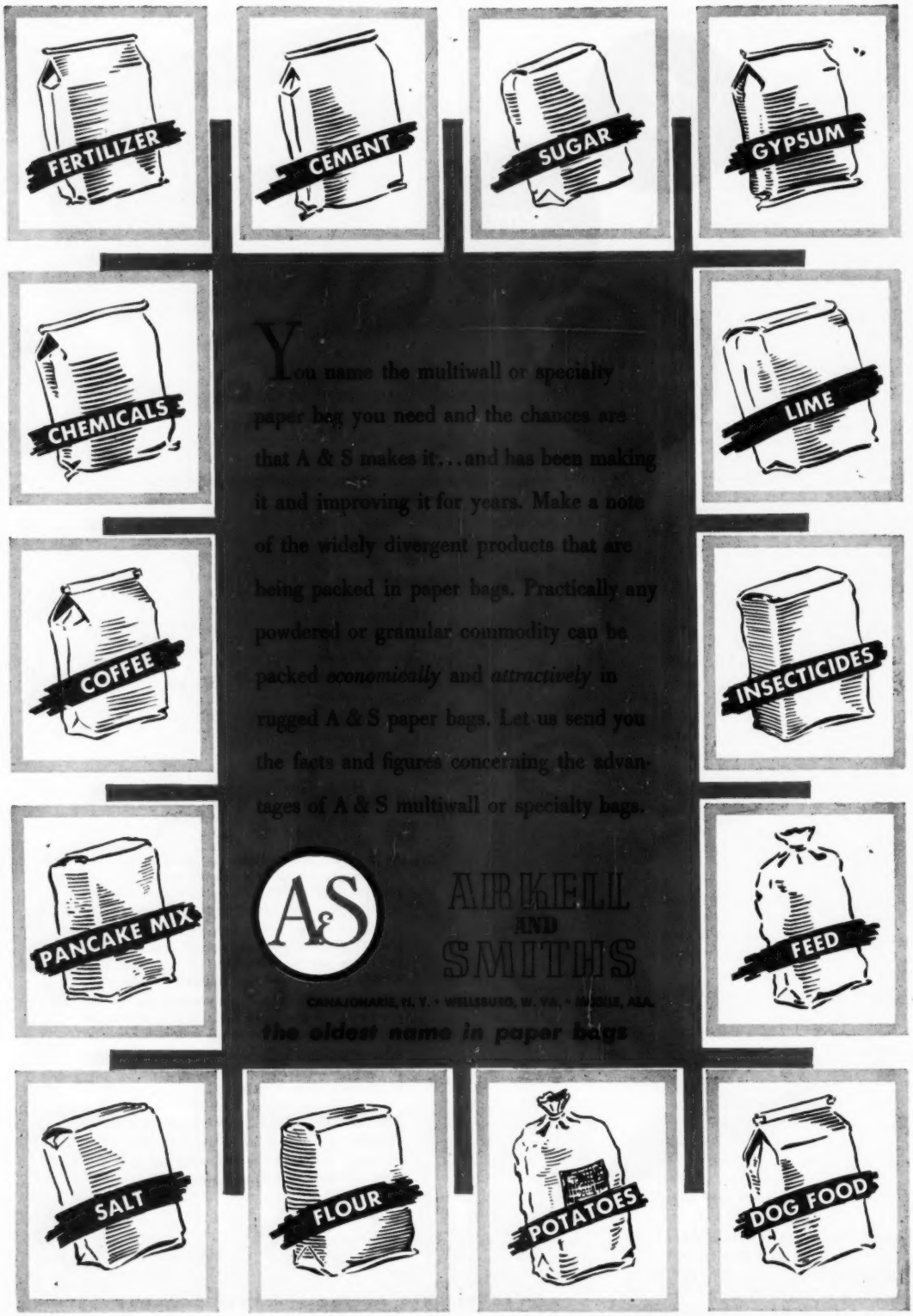

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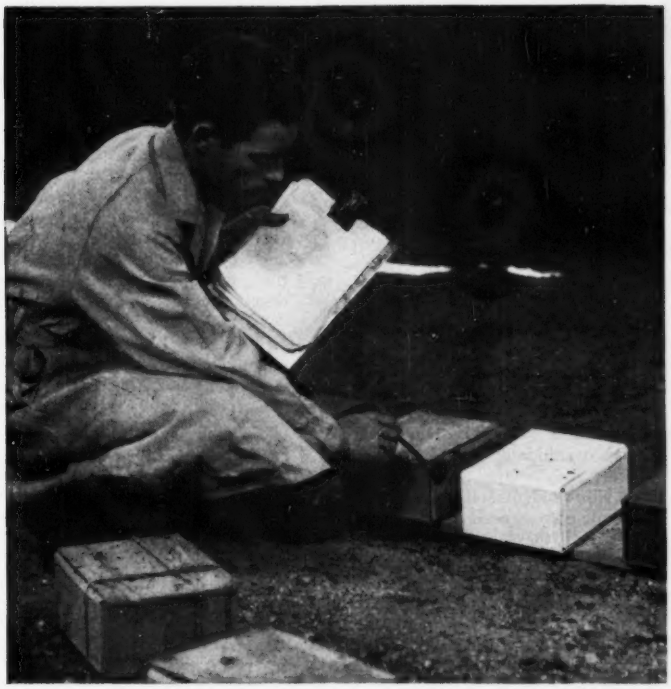

REPELLENT SCREENING: To keep rodents out, five chemicals of promise.

Cash in Keep-aways

Loss estimated at $2 billion—or sometimes as high as 20% of total warehouse value—is the toll taken yearly by rodents.

Foolproof repellents, not just rodenticides, are needed to protect stored goods. Right now, researchers have little more than clues for effective chemical repellents.

One possibility: Polyvinyl films with built-in repellency.

With an annual loss to rodents running into $2 billion, manufacturers, warehousemen, and the Armed Forces are turning to the Fish and Wildlife Service of the Department of the Interior for help in preventing this waste.

After testing over 2,500 chemicals, the Wildlife Service has uncovered perhaps ten that have merit.

And right now, the best solution seems to be incorporating rodent keep-aways in polyvinyl films. Five compounds have been synthesized for use with vinyls; they show promise, but have their drawbacks.

The market for the really effective chemical repellent is large. Present tests show about 5-7 lbs. of repellent are used per 1000 sq. ft. of film. And packagers use thousands of square miles of materials per year.

FWS considers these chemicals as the prime repellents now: zinc dimethyldithiocarbamate-cyclohexylamine complex (B. F. Goodrich's entry); tetramethyl thiuram disulfide (supplied by Du Pont, Eastman Kodak, Monsanto and Sharples); two trinitrobenzene complex derivatives devised by the FWS (produced on order by Edwal Laboratories); and rosin amine D (Hercules Powder Co.).

Drawbacks to the vinyl system of repellency are the difficulties in concentrating enough repellent in the film, and the "sweating out" tendency of some compounds.

Quick on the Gnaw: Repellents are not to be confused with rodent poisons. Impregnating a box with a rat poison isn't very effective—the rodents are quick to gnaw in and do the damage, long before they curl up and die.

Further, poisons scattered around a storage area seldom offer any real protection for edible goods, as the Army's Quartermaster Corps has discovered. They put the job of finding suitable repellents up to the Fish and Wildlife Service in 1946.

More Than a Keep-away: A repellent must have more than just repellency to be suitable for most packing jobs, according to the FWS. It can't be toxic to stevedores, affect the box strength, or be very odorous. It must discourage more than just one rat, be easy to apply, durable, effective in low concentrations, and have good adhesion or compatibility with adhesives.

Odor and taste have proved poor approaches to repellency. Warehouses become untenantable to humans if the odor is too bad, and an evil taste seldom halts a rat before it has done considerable damage.

Surface coatings with the repellency mixed in, like films or paints, seem to work best. Repellents in boxboard pulp is too costly according to FWS. Mixed with glue, repellents often reduce bond strength. Moreover, rats can still gnaw to the glue line and deface the package.

Chemistry of Repellency: FWS studies show amines, nitroso- and N-containing heterocyclics and sulfur-containing compounds have pretty good effectiveness. Acetates, picrates, and hydrochlorides seem to be the most active salts. Dodecylamine salts are good. Unsaturation seems to help. A FWS rule of thumb: Fungistatic activity seems to be a good index of rodent repellency.

But the FWS is quick to point out that the ideal compound hasn't been uncovered yet by long shot.

DDT on Schedule

First phase of "Operation Spruce Budworm," a DDT campaign against Canadian forest insects, has been successfully completed.

Kolker Chemical Works, Newark, N.J. (subsidiary of Diamond Alkali) supplied 200,000 gallons of spray, delivering one rail tank car per day for 42 days. The spray was shipped by train to within 60 miles of the remote region in New Brunswick, then trucked 60 miles further to an airfield where the spraying planes are located.

Actual application of the DDT will start in June, in an effort to halt the damage of the budworm.

The New Brunswick Government,

investigate

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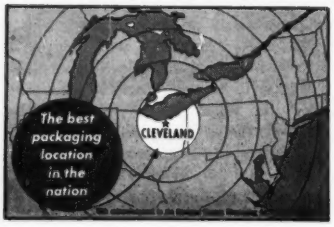

the New Brunswick Paper Co., and the Canadian Federal Government have cooperated on the plan, estimated to cost about $2.00 per acre treated.

Poison Law

Recently passed in Mississippi is a new law affecting economic poisons. Non-residents selling products which are subject to the Mississippi Economic Poison Act of 1950 are required by the new law to file a power of attorney designating the secretary of state as agent to accept service of process.

Companies with a resident agent in Mississippi under the general qualification law are exempt from this requirement.

In addition, the law authorizes the State Plant Board to require such non-residents to post a fidelity bond (ceiling of $10,000 on bond principal) as a condition of doing business in the state.

Non-residents selling household economic poisons need not post the bond, although the other tenets of the law hold.

•

Competition: Formulators of toothpastes, mouthwashes, and perhaps shampoos with chlorophyll will soon be in for competition from Walgreens. The big drug chain is readying these items to be sold under its own label, hopes to have them on the market in 2-3 months.

•

Systemic Insecticide: Pest Control, Ltd., British insecticide manufacturers, has devised a new systemic insecticide to kill mealy bugs on cocoa trees. Called Hanane, after Dr. Hanna, its discoverer, the new systemic is bis-dimethyl - amino - fluorophosphine oxide and bis-dimethyl-amino phosphorus anhydride.

•

B_{12} for Big 12: The Big 12 Corp., (Dallas, Tex.) Southwestern drug supply house, will soon offer a number of new proprietary medicines, the first to be a new iron tonic containing vitamin B_{12}.

•

Smoke Odor Remover: New use for Airkem, chlorophyll-containing odor counteractant, is to remove smoke odors from merchandise contaminated with smoke but not burned. St. Louis office of Airkem offers the service.

•

Insecticide and Miticide: Pennsylvania Salt Co. of Washington has developed a new insecticide containing Pennsalt's organo-phosphate, malathon. The new product, Penthon, is designed principally for protection of apples and pears, is said to control aphids and mites. Penthon E-50 is an emulsifiable concentrate with 50% malathon; W-25 is a wettable powder with 25% malathon.

•

Keep It Dry: Davison Chemical Corp. has introduced a new line of silica gel desiccants called Dri-Pax for the pharmaceutical industry.

•

New in Cuba: Newly-organized McKay-Davis Chemical Corp. of Cuba, Havana, will manufacture and package pharmaceutical products under trade and brand names of American drug firms entering the Cuban market.

•

New Vitamin Tablets: Dicalets, multivitamin and mineral tablets, have been developed by Abbott Laboratories (Chicago) for supplementing the diets of expectant and nursing mothers.

Foam from the Faucet

Grabbing a handhold on the fast-moving liquid synthetic detergent bandwagon (CW April 26) are specialties makers with devices for automatically adding detergent to dishwater supply. The new gadgets, mainly for restaurants, attach to the faucet, and when the water is turned on, feed a predetermined quantity of detergent into the water flow. Diameter of the supply-tube orifice and the detergent viscosity fix the amount of sudser sucked into the water—suppliers provide equip-

Scented Shirts

PERFUMED PRESSING, achieved by adding a few drops of scent to the water reservoir of the new Steam-O-Matic iron, is the latest wrinkle in ironing. The iron can also be used as a room deodorant by rocking it back on its heel to disperse scented steam into the air.

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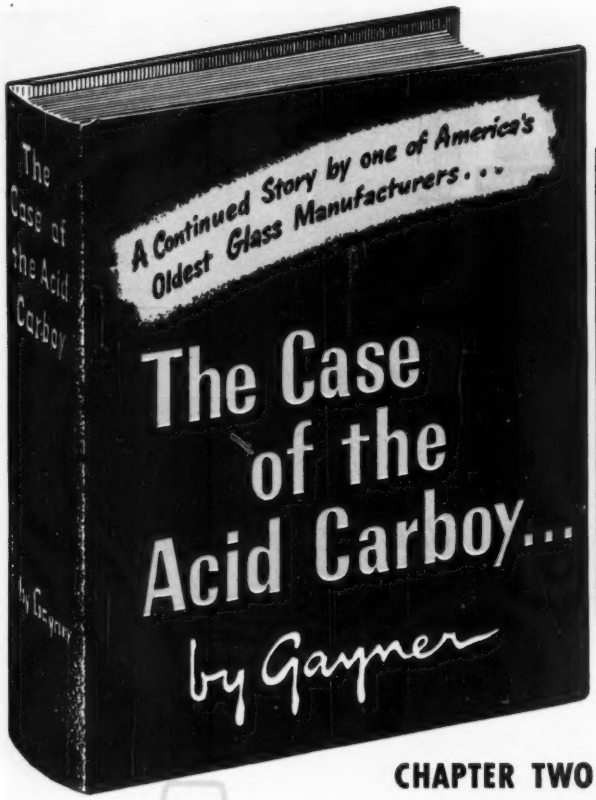

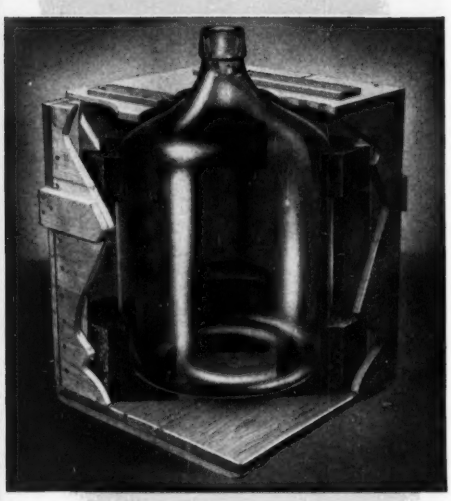

CHAPTER TWO

Mustache cups and gas-lights—stereoscopes and quilting parties—were in their prime when Gayner glass carboys first became the chemical industry's standard carrier for acids. In those days, overnight deliveries by fast truck and rail were unknown—but the advantages of *glass* for shipping and storing corrosive liquids were just as well known and valued as they are today—full visibility of contents—easy and complete cleansing for re-use—low cost of return and replacement—handling and pouring ease—simplified inspection and checking.

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7. Box is clear, sturdy, seasoned white pine. Bottle easy to install; convenient to handle and store.
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ment that will work only with their own detergents.

This is the first year suppliers have really gone all-out to get the restaurant business. It will mean a boost in the sales of synthetic detergents, a break for the hardware suppliers making the units, and also a break for a Chicago firm, Ninol Laboratories. Reason: Ninol holds patents on a series of nonionic amidosulfonate-complex detergents with viscosity-increasing properties.

Among those out to promote controlled flow detergent units this spring are Davies-Young Soap Co., Dayton, O. (unit called Buckeye Dyjet; detergent, Dysh); Hysan Products Co., Chicago (Proportionaire; Mark); Peck's Products Co., St. Louis (EXP); James B. Varley & Sons, St. Louis (Mr. Foam; Sunny Suds). They'll soon be joined by the Honeywell Co., Cincinnati; Protexall, Evansville, Ind.; and the St. Louis Janitor Supply Co.

They all advance the idea that the restauranteur gains convenience, saves 25% in dishwashing costs, and eliminates spillage and waste when he uses the automatic detergent devices.

At present most of the formulators retain ownership of the gadgets, lease them to jobbers, who in turn may lease or lend them to users. An exception is Varley's Mr. Foam, which is sold directly to users for $9.95.

With the unit efficient only with the detergent for which it is designed, suppliers are assured of continued detergent sales to the unit's user.

Vegetable Oleic

Now in production at Emery Industries' Cincinnati plant is Emersol 240 Vegetable Elaine, said to be the first non-animal based fatty acid comparable in quality and properties to oleic acid.

The new compound consists of mono-unsaturated acids, with an iodine value (84-90) corresponding to oleic. Advantages claimed: oxidation stability far superior to that of animal-based oleic, a bland odor and light color. It is priced to compete with conventional double distilled oleic acid.

Main use now is in castile shampoos, although Emery suggests applications in carbon paper manufacture and synthetic rubber polymerization.

Other outlets: Kosher soaps and specialties.

PICTURES IN THIS ISSUE:

Cover (top & pp. 22 & 23) — Lionel Crawford, McGraw-Hill; p. 17 (left)—United Press Photo; p. 17 (right)—Wide World Photo; p. 19—Imperial Oil Ltd.; p. 25 (bottom left & right)—Phillips Petroleum; p. 35—Sol Goldberg, Cornell Univ.; p. 50—Wide Word Photo.

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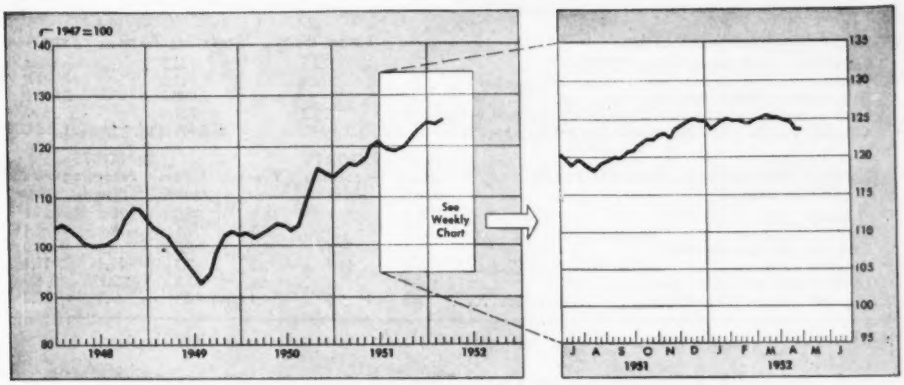

CW Index of Chemical Output—Basis: Total Man Hours Worked in Selected Chemical Industries

MARKET LETTER

If the labor tangle didn't give you the jitters last week, you aren't the average business man. But there are heartening developments too.

For one thing, Washington gave official recognition to the actual state of the market. In its Issue No. 6 of the bi-monthly List of Basic Materials and Alternates, Defense Production Administration said: "The consistent softening of chemicals reflects lessened demand, partly seasonal."

This is, of course, a mixed blessing. Most producers, however, aren't afraid of the softening, realize that basically the economy is robust. They welcome a return to "normalcy," are itching to operate without a staff to handle the paper work Washington controls entail.

Specifically, DPA's list carried for the first time these chemicals, all in Group I (materials whose supply is insufficient for military and civilian demands): alkyl phenol resins, beta gamma picoline, isonicotinic acid, zinc chloride and zinc ammonium chloride.

Monochlortrifluorethylene moved from Group II (in approximate balance with military and civilian demand) to Group I.

But all other chemicals showed an easing in supply. Moving from Group I to Group II were: basic lead carbonate, chlorine, hexylresorcinol, lead arsenate, red lead oxide, litharge, orthophosphoric acid, phosphate plasticizers, phosphorus, resorcinol, resorcinol resins and styrene.

Nicotinic acid, formerly in Group I, appeared in Group III (materials in fair-to-good supply). Dropped from Group II to Group III: acetic acid, aniline, anthaquinone dyes, cellophane, glycerine, hydroquinones, phenol, and polytetrafluorethylene.

And now removed from listing because they are in plentiful supply: calcium chloride, caustic potash, caustic soda, epsom salts, soda ash.

Here's what this NPA appraisal of supply means: There'll be a further relaxing of controls, barring long continuation of strikes.

Decontrol may actually be pushed forward ahead of any Washington schedule for such action. It's the talk about decontrol that's doing it.

For material and price controls need industry cooperation to be

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
CHEMICAL WEEK Output Index (1947=100)	123.2	123.5	120.3
Bituminous coal production (daily average, 1000 tons)	1,622.0	1,533.0	1,741.0
Steel ingot production (thousand tons)		2,090.0	2,073.0
Stock price index of 14 chemical companies (Standard & Poor's Corp.)	222.2	227.4	238.5
Chemical process industries construction awards (Eng. News-Record)	$28,004,000	$36,469,000	$21,790,000

MONTHLY INDICATORS—FOREIGN TRADE (Million Dollars)	EXPORTS Latest Month	EXPORTS Preceding Month	EXPORTS Year Ago	IMPORTS Latest Month	IMPORTS Preceding Month	IMPORTS Year Ago
Chemicals, total	78.6	76.1	63.3	24.0	26.0	25.8
Coal tar products	5.5	6.4	5.0	4.1	3.4	4.4
Medicinal and pharmaceuticals	23.1	22.1	18.7	0.5	0.5	1.0
Industrial chemicals	13.0	13.3	9.3	7.7	11.4	11.1
Fertilizer and fertilizer materials	4.4	3.8	2.6	11.2	9.9	8.6
Vegetable oils and fats, inedible	6.5	5.5	4.4	10.4	9.1	10.2

successful. Washington can't hire enough policemen to enforce its orders; and it must depend on industry for men to make regulations technically realistic. Controls when materials are ample gripe businessmen; and since Wilson quit, fewer companies want to lend men to the Government.

But chances are materials controls, and some price regulations will be kept. For the mobilization program is about 70% complete, and Congress won't jeopardize the remaining 30%.

Three industrial advisory groups last week told OPS that ceiling prices "should be extended indefinitely" for coal chemicals, oven coke and coal tar. Their reason: The existing price regulation (SR 13), scheduled to expire May 31, is superior to any dollars-and-cents regulation the agency might draft.

Removal of sebacic acid from NPA's basic chemicals allocation regulation (M-45 order) leaves only five chemicals still under wraps. Increased production since sebacic was placed under allocation is behind the action.

The defense emergency will boost annual demand for glycerin to about 40 million pounds above normal in three years. So said DPA in disclosing its new capacity goal for natural and synthetic glycerin: 278 million pounds by January 1955, a 53 million pound increase over 1951.

But that's three years hence. This week the Oilworkers' strike reached in and shut off Shell Chemicals' synthetic glycerin faucet. One result: Stocks, which have been accumulating for several months, will stabilize—or even decrease.

Pig lead was cut this week 1¢ a pound below ceiling to 18¢. Lead-containing pigments were reduced proportionately.

On the other hand, a 55¢-a-pound ceiling price jump for tungstated pigments goes into effect May 10. The increase was taken under the recently adopted OPS product standard (*CW, May 3*).

An end to the two-month strike of Chilean nitrate workers will soon ease U.S. farmers' concern over sodium nitrate imports.

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending May 5, 1952

DOWN	Change	New Price		Change	New Price
White Lead-Carbonate	$ .008	$ .1850	Beeswax, African, crude, bgs.	$ .02	$ .47
Zinc Oxide, leaded, 50%	.0025	.1750	Carnauba, No. 3, ref., bgs., ton lots	.01	.95

All prices per pound unless quantity is stated

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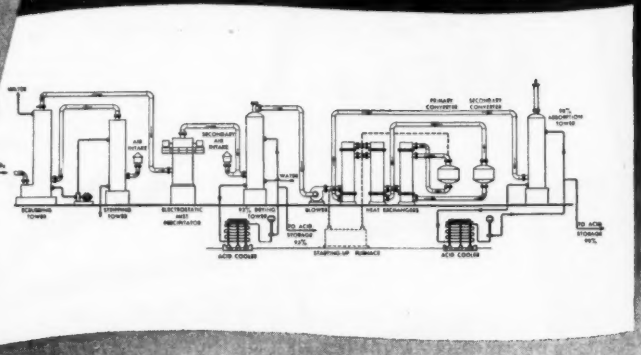

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*Weekly Loss Due to Steel Strike**

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AMMONIA LIQUOR (100% NH_3)	793,500 lbs.
AMMONIUM SULFATE (via coal tar)	28,620,000 lbs.
BENZENE	
Nitration (1°)	712,500 gal.
Industrial (2°)	1,968,000 gal.
Total	2,845,000 gal.
TOLUENE	548,000 gal.
XYLENE	145,500 gal.
NAPTHALENE (crude)	1,302,000 lbs.
PYRIDINE	
Crude (dry basis)	7,900 lbs.
Refined (2°)	23,700 lbs.
SOLVENT NAPTHA	93,500 gal.
CREOSOTE OIL	530,500 gal.

** CW estimate of captive and contract production, using 1951 Bureau of Mines figures.*

Strikes: Loss of Two Legs

The off again-on again steel strike and the walkout of a good share of the nation's oil workers (see page 17) made producers forget the softening chemical market last week, face the loss of coke-oven and refinery chemicals. Also lost while refineries are out: the mammoth market for chemicals represented by the petroleum industry.

Although no one could say how long the oil strike would continue, or when real steel peace would be restored, there was no doubt that the effects of both were being felt by all the chemical process industries. For if sulfuric acid and alkalies are the vital organs of the chemical economy, coke ovens operated in conjunction with steel furnaces, and petroleum refineries are its legs.

And last week the chemical industry was fast becoming immobile.

Upsetting the Balance: The amounts and kinds of chemicals affected by the stoppage are shown in the accompanying tables (*petroleum on page 60*). Supply of most of these has been in fair balance with demand, so the stoppages aren't nearly as catastrophic as they would have been six months ago. One outstanding exception is ammonium sulfate which has been tight and could become critical.

But the chemical industry is so closely integrated with petroleum production that the effects are more far-reaching than is apparent from a consideration of refinery chemicals. Not only do chemical producers rely on petroleum operations for raw materials, but the petroleum industry is one of their biggest customers. Refiners buy over $225 million of chemicals of all kinds; over $100 million is estimated to go into lubricants manufacture; the petrochemical industry itself consumes millions of pounds of sulfuric acid, chlorine, hydrochloric acid, hydrofluoric acid, bromine, acetic acid, lime and caustic soda. As gasoline consumption is lowered, the market for tetraethyl lead suffers proportionately.

Paralysis in Texas: A look at what the partial oil strike—estimates of national refinery capacity down vary from 30% to over 50%—did to Texas area production shows the effect.

• Monsanto. Propane supply cut, operating at reduced rate on supplies from natural gasoline and LPG plants in the field. Benzene supply reduced, getting some from byproduct coal producers to meet styrene requirements.

• Carbide. Loss of feed stock substantially curbing production of primary products. Has as much stock as storage permitted and getting some from minor sources.

• Consolidated Chemical. Closing two Houston units, will use time to make needed repairs. Plants at Baton Rouge and Fort Worth not much affected, but if strike spreads, catalyst plant at latter location will close. Reshuffling shipments of acid to areas

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PETROLEUM CHEMICALS

Weekly Loss Due to Oil Strike*

BENZENE (except motor grade).	**345,000 gal.**
CRESYLIC ACID	**18,000 gal.**
NAPHTHENIC ACIDS	**29,000 gal.**
TOLUENE (all grades)	**435,000 gal.**
XYLENE (all grades)	**600,000 gal.**
OTHER AROMATICS	**5,120,000 lbs.**
C_2 HYDROCARBONS	**17,025,000 lbs.**
C_3 HYDROCARBONS	**16,275,000 lbs.**
C_4 HYDROCARBONS	**15,750,000 lbs.**
OTHER ALIPHATICS	**3,425,000 lbs.**
WAXES	**12,000,000 lbs.**

**** CW estimate of loss if 50% of refineries are closed, based on latest Government figures.***

where in short supply.

• Ethyl Corp. Houston plant will continue to operate until storage is filled, since refineries cannot take output.

• Phillips. Catcus ammonia plants closed; hence Houston ammonium sulfate unit will have to be shut down too. Borger copolymer plant closed.

• Jefferson Chemical. Down for annual repairs and because of loss of feed stocks.

• Sinclair. Feed stocks cut off, Houston butadiene plant can operate for about three weeks on reduced scale.

• Dow. Not much affected now, but in 3-4 weeks will be curtailed. Benzene for styrene not in large reserve; also will be losing sales to refineries.

• Shell. Deer Park operations down.

• Diamond. Affected by Shell which had been getting chlorine, hydrogen and caustic from Diamond, supplying ethylene. Diamond has enough ethylene for a month's operation, is shipping chlorine to other points.

• Goodyear. Expects to operate synthetic rubber plant for 3 weeks. (Sinclair supplies butadiene; Dow and Monsanto, styrene).

And so it goes in the heart of the petrochemical industry.

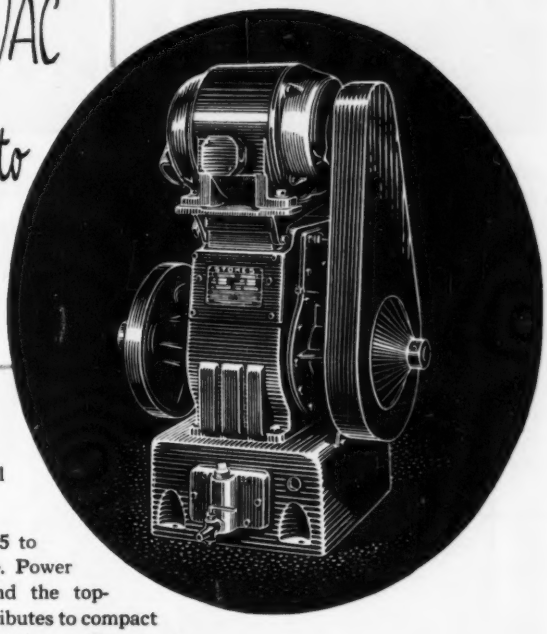
Slow Recovery: Such effects are only the immediate ones. In addition, the chemical process industries will suffer, like all industries, from the loss of steel and steel manufactured goods, and from curtailment of fuel supplies.

Since the chemical industry is so dependent upon the key industries now tied up, however, the total impact is more severe for it. So, badly hobbled by the shut-downs last week, chemical producers knew that if the strikes were not settled soon, they would still be limping badly for a good while after peace is restored.

Government Needs

Bid Closing	Invitation No.	Quantity	Item
General Service Administration, 1114 Commerce St., Dallas, Tex.			
May 13	FW-21851	470 gal	Paint, rubber base, TT-P-91A
		97 gal	Paint, ready-mixed, TT-P-59 and amendment 2
		120 gal	Primer, paint, TT-P-633
May 14	FW-21874	9600 lb	Wax, floor, paste, P-W-158 and amendment No. 1
Business Service Center, General Services Administration Region 3, Washington 25, D.C.			
May 15	2W-11837R	13008 lb	Soap, powder, laundry
Commanding Officer, New York Chemical Procurement District, 180 Varick St., New York, N.Y.			
May 13	(Cml-30-070-52-778)	295500 lb	Calcium chloride, hydrated tech. grade, flake
		166400 lb	Potassium hydroxide, caustic potash, technical, minimum of 90 percent KOH, nut size
		7350 lb	Sodium hydroxide, caustic soda, tech. 95% flake in 75 lb drums
		40000 lb	Sodium hydroxide, caustic soda, technical, 95 percent lump, nut, in 400 lb drums
			Sodium hydroxide, caustic soda, technical, 98 percent flake, cleaning plate, lithographic in 5 lb cans

STOKES MICROVAC PUMPS...are basic to Vacuum Processing



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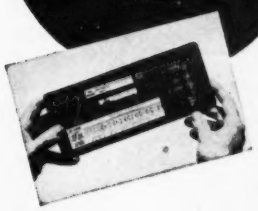

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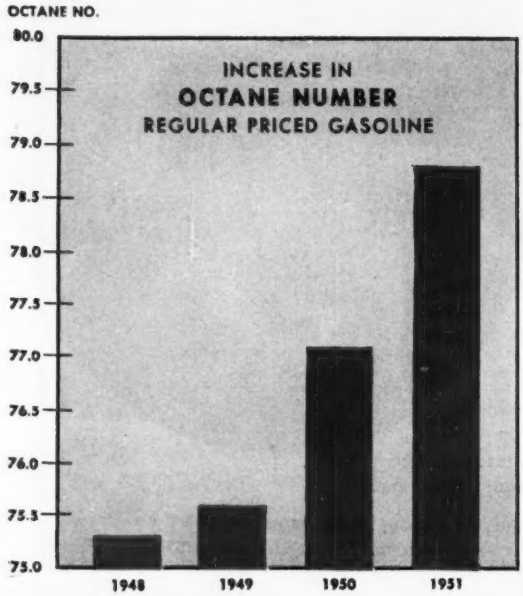

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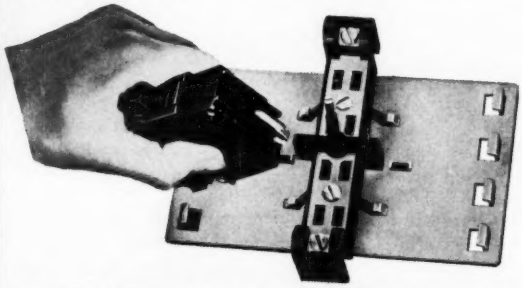

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Chemical Newsfront

NEW PRODUCT NEWS

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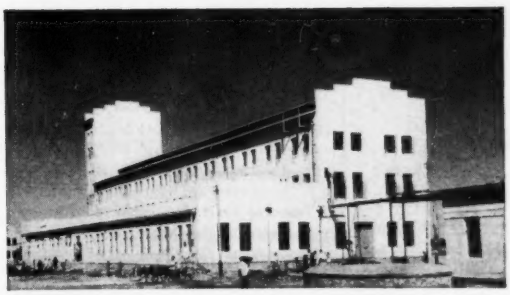
N,N'-METHYLENEBISACRYLAMIDE $(CH_2=CHCONH)_2CH_2$

These new crystalline monomers are available in trial-lot quantities. They are reactive monomers having long shelf life and should be useful for applications requiring a polymer with additional functional groups. Possible fields of application: synthetic fibers, surface coatings, textile and paper finishes, and ion-exchange resins.



INDIA'S FIRST DYESTUFFS AND PHARMACEUTICAL PLANT opens at Bulsar. Built with technical and engineering assistance from American Cyanamid, this new plant, Atul Products Ltd., was described by Prime Minister Nehru as "one of the major construction works of New India." The $3,500,000 plant will be managed entirely by Indian engineers and scientists. It will produce a major portion of India's requirements of azo and sulfur dyes, as well as aureomycin, sulfa drugs and folic acid.

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SODIUM SULFIDE

Formula: Na_2S

Appearance: Light, buff colored solid in flake form

TYPICAL PROPERTIES

Molecular Weight	78.1
Melting Point	100° C
Na_2S	60-62%
Water of Crystallization	35% min.
NaCl	1.5% max.
Other Na Salts	2.0% max.
Fe	8 ppm max.
Other Heavy Metals	1 ppm max.

USES

Dehairing Agent: Hides

Desulfurizing Agent: Viscose rayon

Intermediate: Chemicals, dyestuff intermediates

Metal Processing: Ore flotation, metal refining

Other Uses: Manufacturing paper pulp, rubber; textile processing.

SODIUM SULFHYDRATE

Synonym: Sodium Hydrosulfide

Formula: NaSH

Appearance: Light lemon colored solid in flake form

TYPICAL PROPERTIES

Molecular Weight	56.1
Melting Point	55° C
NaHS	70 to 72%
Water of Crystallization	26% min.
Na_2S	2.5% max.
Other Na Salts	1.2% max.
Fe	5 ppm max.
Other Heavy Metals	1 ppm max.

USES

Dehairing Agent: Hides

Desulfurizing Agent: Viscose rayon

Intermediates: Dyestuffs; organic chemicals such as thioamides, thiourea, thioglycolic acid, thio- and dithiobenzoic acids, sodium thiosulfate.

SODIUM TETRASULFIDE SOLUTION

Formula: Na_2S_4

Appearance: Clear, dark red aqueous solution

TYPICAL PROPERTIES

Molecular Weight	174.2
Freezing Range	3.5° to −17° C
Distillation Range	115° to 120° C
Specific Gravity, 15.5°/15.5° C	1.335
Na_2S_4	40%
Sulfur	30%

USES

Soaking Agent: Hides and skins prior to unhairing

Reducing Agent: For organic nitro bodies

Reagent: Ore flotation

Intermediate: Sulfur dyes

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BOOKS . . . . .

DDT and Newer Persistent Insecticides, by T. F. West and G. A. Campbell. Chemical Publishing Co., Inc., New York, N.Y.; xiv+632 pp., $8.50.

Volume spotlights DDT—its physical and chemical properties, manufacture, formulation and applications—against the newer persistent insecticides, (chlorinated hydrocarbons), and their insecticidal properties. Numerous data tables are included.

Color in Business, Science, and Industry, by Deane B. Judd. John Wiley & Sons, Inc., New York, N.Y.; ix+401 pp., $6.50.

A discussion of the psychophysics of color in the practical terms of purchase, production and sales. Guided by the belief that color problems are business problems, the author explains the details of color science—the "basic facts," tools and techniques, and the physics and psychophysics of colorant layers.

MEETINGS...

Synthetic Organic Chem. Mfrs. Assn., Commodore Hotel, N.Y., May 14; joint meeting with MCA, Greenbrier Hotel, White Sulphur Springs, W. Va., June 23-25.

Soc. of Cosmetic Chemists, spring meeting, Biltmore Hotel, N.Y., May 15.

Inst. of Paper Chemistry, annual executives' conf., Appleton, Wis., May 15-16.

Natl. Cottonseed Prod. Assn., annual convention, Roosevelt Hotel, New Orleans, La., May 19-21.

Amer. Soc. of Quality Control, Syracuse, N.Y., May 22-24.

Flavoring Extract Mfrs.' Assn., annual meeting, Edgewater Beach Hotel, Chicago, May 25-28.

Natl. Assn. of Purchasing Agents, annual convention, Convention Hall, Atlantic City, May 26-28.

Chem. Inst. of Canada, annual conf. & exhibition, Mount Royal Hotel, Montreal, June 2-4.

Assn. of Consulting Chemists & Chem. Engrs., outing, Westchester Country Club, Rye, N.Y., June 6.

Chem. Specialties Mfrs. Assn., midyear meeting, Copley-Plaza Hotel, Boston, June 8-10.

Natl. Fire Protection Assn., annual meeting, Statler Hotel, N.Y., June 9-13.

Div. of Medicinal Chem., national chemistry symposium, Univ. of Virginia, Charlottesville, June 12-14.

Natl. Fertilizer Assn., annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va., June 16-18.

Div. of Analytical Chem., annual summer symposium, Michigan State College, East Lansing, June 20-21.

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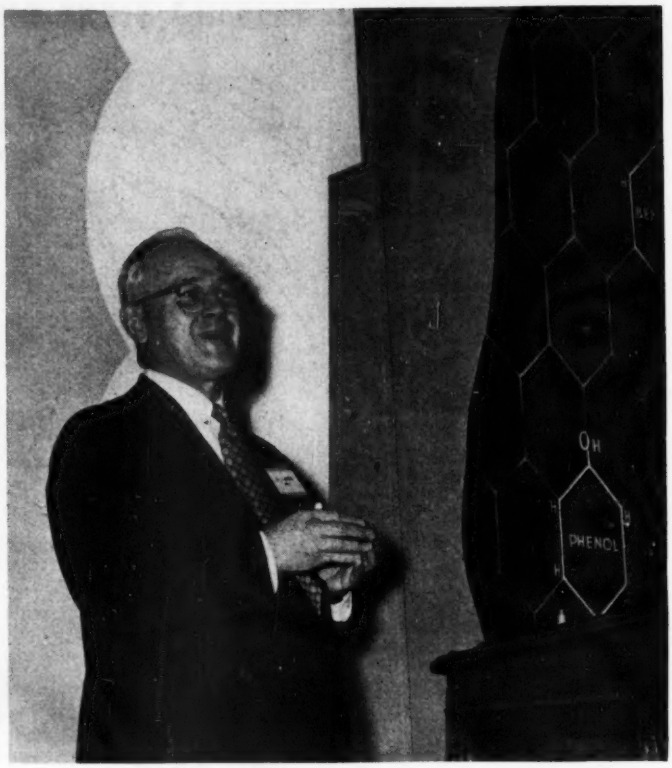
PRODUCTION . . .



DAVIDSON: Riding a hunch on chicken-wire chemicals.

Gentle Tap, More Products

Carbide takes the wraps off its $11 million coal hydrogenation pilot plant to treat 300 tons of coal a day.

But it may be possible to push throughout to 5-600 tons a day. Next step: a plant with 3,000-ton units.

Carbide gets economies from emphasis on chemicals rather than fuels, quicker reaction, abundant hydrogen.

Despite the steady rain that fell earlier in the week and the fog that hung over the valley just after dawn, the sun broke through in midsummer form last Wednesday. Carbide and Carbon officials, in high glee over the unexpected fine weather, were on hand to greet the visiting press. Occasion: Unveiling of the company's $11 million coal hydrogenation plant at Institute, in West Virginia's highly industrialized Kanawha Valley.

For some time, industry has been aware of Carbide's interest in the project (*CI Newsletter, July, '47*). A tipoff on the pilot plant came last November when the Government issued a certificate of necessity (*CW, Nov. 3, '51*). Few, however, realized either the progress that has already been made or the scope of future plans.

Carbide explains that the plant has been in continuous operation for about five weeks. Designed to process 300 tons of coal a day, it should show a profit at that figure. But actually, many of the units are duplicated (one to be held in stand-by condition to insure continuous production) and both laboratory data and pilot results so far indicate that it may be feasible to treat 500-600 tons a day. It doesn't take an economic wizard to figure that if it can make money at rated capacity, it will become a highly at-

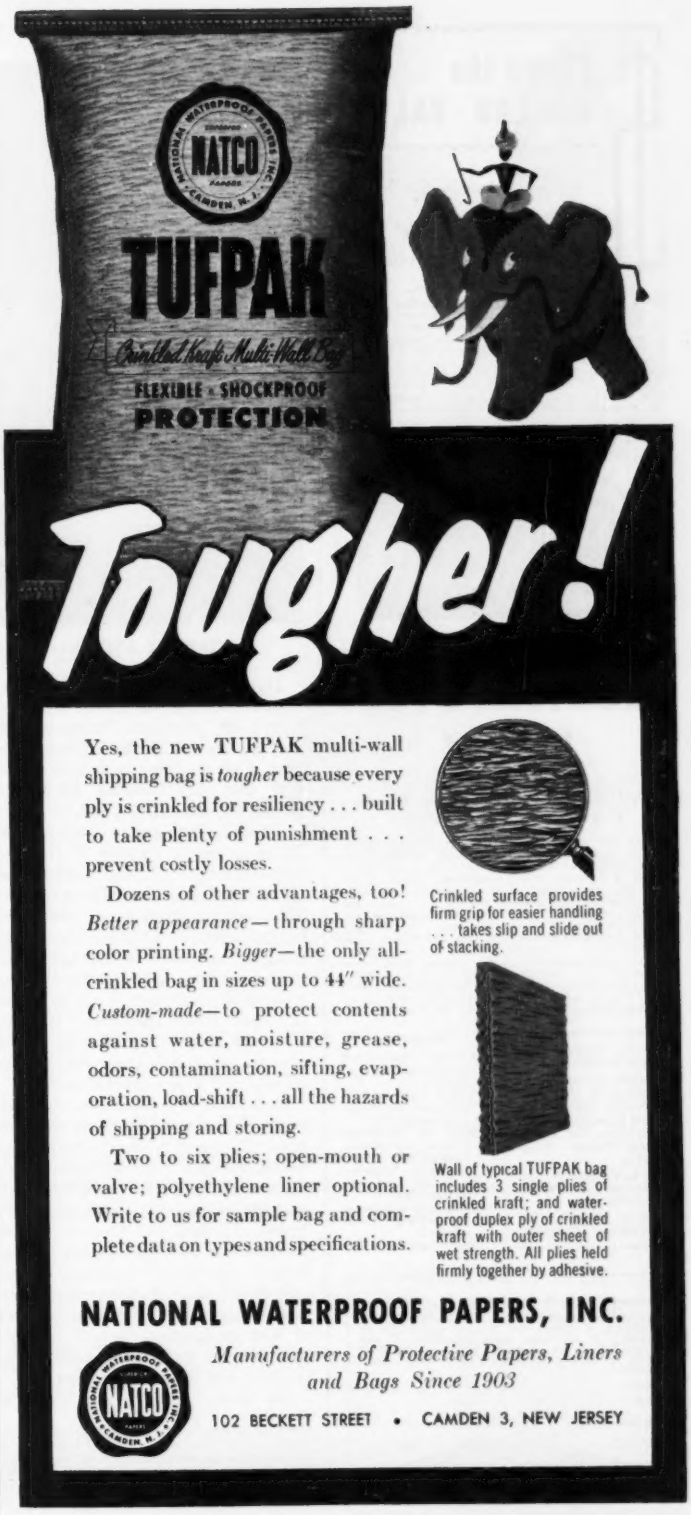
tractive venture if the throughput can be doubled. What's more, company officials, usually conservative and cautious on such matters, are enthusiastically talking about a bigger plant made up of units capable of handling 3,000 tons daily.

The Name's the Same: Coal hydrogenation as practiced by Carbide and Carbon should not be confused with the project of the same name proposed by the Bureau of Mines. For the latter's interest lies in obtaining liquid fuels while Carbide eschews the gasoline angle altogether, puts all the emphasis on chemicals.

President Davidson has dubbed these chemical products of coal hydrogenation "chicken-wire chemicals" because of the hexagonal carbon pattern present in the hunks of coal. He compares the coal with a completed jigsaw puzzle. Says he: "Take the jigsaw, shake it, shuffle it and kick it around. You'll find it will break down into many double pieces and you'll get a liberal sprinkling of single pieces. That's what happens in the conventional coking of coal. On the other hand, if you tap the puzzle gently around the edges, you'll get many big pieces and only a few single pieces. That's what we're doing at Institute."

What it boils down to is this: Conventional coking yields large quantities of benzene, phenol, toluene and other aromatics. Carbide's coal hydrogenation will turn out large quantities of those products too, but in addition it will produce a considerable amount of the higher aromatics. For instance, Carbide expects to get 5 to 8 times the quantity of naphthalene produced from a ton of coal by coking measures, 100 to 200 times as much of the higher phenolics (like the cresols) and 300 to 500 times the amount of higher amines (like quinoline).

Since the process will also turn out quantities of chemicals for which no big present market exists, the whole project is, in a sense, a long-term calculated risk. It means too, that Vice President Harry McClure and his assistant Al Tenney, who will be responsible for selling the products, have their work cut out for them. Both are confident that markets will open up, are pinning high hopes on the eventual union of their new aromatics with standard aliphatics to make many new chemicals. And, as McClure puts it, "It will mark the first time in American chemical history that a customer can look to one supplier as a potential raw material source for any organic compound that can be synthesized."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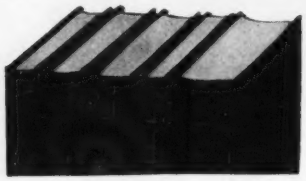

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TENNEY AND McCLURE: In their bag of tricks, everything.

Davidson, too, is confident that new markets will open up for the aromatics. "After all," he says, "that's just the way we started in the aliphatic business. Call it riding a hunch, if you will. But our hunches have been paying off for thirty years."

There's a lot more to it than simply riding a hunch, though: If the markets don't open up, the products can be modified to fit the existing markets. Take methylnaphthalene, which will be produced in considerable quantities. The compound is used principally in aerosols now. If the demand doesn't grow with production, it can be altered to some other chemical. "If worst comes to worst," says Davidson, "we can always knock the methyl group off and sell it as naphthalene."

But Costs are Different: Carbide's work sheds new light on the controversial question of coal hydrogenation economics. For while groups have taken issue with the Bureau of Mines' cost estimates (viz., the National Petroleum Council and Ebasco), no one can question Carbide's figures—its past history consists of spending money only to get more. As the company sees it, chemicals are the natural products of coal gasification. To get synthetic gasoline, you must spend more money to get a less lucrative product.

To prove this, George Felbeck* points to Bureau of Mines figures. Chemicals—which account for only 20% of the products—contribute 60% of the gross income. Moreover, an extra hydrogenation step is necessary to produce gasoline and that means more hydrogen and a bigger investment.

Felbeck adds that the company left the beaten track to develop new techniques for hydrogenation, came up with a slick, new, wholly continuous process. An important contribution was cutting the residence time in the hydrogenator. The best the Germans (who pioneered coal hydrogenation for fuel) were able to do was 45 minutes. Carbide engineers cut that time by more than 90%. Actually they report that they can bring it down to less than one minute but that they are limited by means of dissipating heat in the exothermic reaction.

Big Jump: Felbeck admits to an "uncomfortable position" in the design of the present plant since it represents a big jump from laboratory scale. But he says that it will make it a lot easier when it comes to designing bigger units.

Presently, the pilot plant is operating on coal from nearby West Virginia hills. Coal is crushed, then pulverized to about 20 mesh. After being dried with gas it is mixed with recycled oil to form a paste.

The paste is sent through a preheater, then to the hydrogenator where it reacts with hydrogen to form predominantly liquid products. The

* Vice president of Carbide and Carbon. In charge of the Physical Processes Department, he set up and supervised engineering, development and operating organizations for the K-25 gaseous diffusion plant at Oak Ridge. He is also responsible for the new $500 million installation at Paducah (Ky.).

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Coal Hydrogenation Schedule at Institute

At present, no chemicals are ready for sale. But these will be the first:

- **High-boiling phenols, chiefly monohydric, alkyl substituted phenols.**
- **Aromatic hydrocarbon solvents.**

These will be produced for captive purposes:

- **Benzene**
- **Naphthalene**
- **Phenol**
- **Cresols**
- **Xylenols**
- **Aniline**

These will probably be available after further study on abundance and means of separation:

- **Toluene**
- **Xylenes**
- **Mixed toluidines**
- **Indole**
- **Mixed xylidenes**
- **Alkyl pyridines**
- **Quinoline**

A number of other chemicals are found in the products. Some of those that occur in economically recoverable quantities may be offered for sale. Here are a few of the ones that have been identified:

- **Indane**
- **Acenaphthene**
- **Fluorene**
- **Anthracene**
- **Phenanthrene**
- **Indanol-4**
- **Dibenzofurane**
- **Indanol-5**
- **3-Phenylphenol**
- **2-Methylquinoline (quinaldine)**
- **Carbazole**
- **2-Methyl-6-ethyl-pyridine**
- **3-Methylindole (Skatole)**

hydrogenator is built to operate at any temperature between 450 and 550 C. and pressures up to 6,000 psi. The vapor and liquid streams from the hydrogenator are separated; the vapor stream is condensed and unreacted hydrogen and other gases released.

At this point, then, the product consists of three parts: a heavy oil, a light oil and a gas stream. The gas stream is made up of hydrogen and C_1-C_4 hydrocarbons along with smaller amounts of other gases. Hydrogen is separated and recycled; hydrocarbons are separated for use as raw materials for Carbide's other operations, fuel or bottled gas.

Unreacted coal solids are removed from the heavy oil and the oil divided into three fractions. The most volatile serves as a purge to remove the remaining heavy oil in the solid residue. Next fraction is used as the recycle oil in the pasting operation. The residue, the third fraction, contains a high-premium pitch which is finding a ready market in high-temperature electrodes made by Union Carbide's National Carbon.

The light oil from the hydrogenator contains the chemicals—the most important products of the process. It, in turn, is broken down into an acid fraction (phenolic), a basic fraction (aryl amines and nitrogen heterocyclics) and a neutral oil (hydrocarbons). The various fractions can be separated, purified by usual means.

Why Coal: Why should Carbide go to great lengths establishing a prosperous business based on petroleum hydrocarbons, then turn around and start on coal as a raw material? That question was asked and answered by George Curme (vice president, research, and director, Union Carbide). He explains that the decision is the result of some twenty years and $5-$7 million worth of research. When the project was started, the Bureau of Mines estimated there was only fifteen years supply of petroleum in sight. Coal is more abundant than petroleum, but the chemical industry is still expanding rapidly while the steel industry, on which it depends for coal tar raw materials, has now just about reached its maturity. Says Curme: "We didn't fear a complete disappearance of petroleum, but we realized that a chemical manufacturer must have a low-cost source of supply as well as an abundant one."

By betting on coal as well as petroleum, Carbide is, paradoxically, risking capital to avoid risk—whatever happens.

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Centrifuge, Bird, 24" cont. Type CH series 200. Heat & Power Co., Inc., 70 Pine St., N.Y. 5.

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Lithium Stearate

Technical service report on lithium stearate describes component ingredients and methods of preparation utilized in the making of lithium greases. Tables and graphs provide visual data on typical properties, procedures, and performance of the compound in various base oils. Witco Chemical Co., 295 Madison Ave., New York, N.Y.

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10-p. booklet reviewing the uses, physical properties and general characteristics of three "Atlac" unsaturated alkyd-type resins, marketed to the reinforced plastics industry for use as a component of industrial laminates. Atlas Powder Co., Wilmington, Del.

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